



The University of  
**Montana**

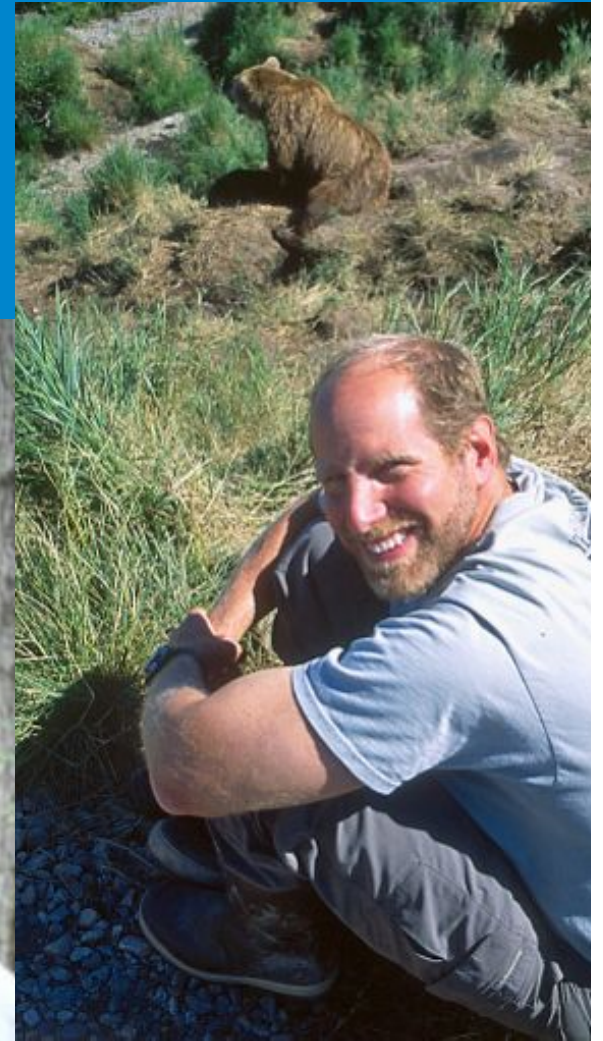
Center for Natural Resources  
and Environmental Policy



CENTER FOR LARGE LANDSCAPE CONSERVATION



**Gary M. Tabor VMD MES**  
**wildcatalyst@gmail.com**















Photolibrary.com

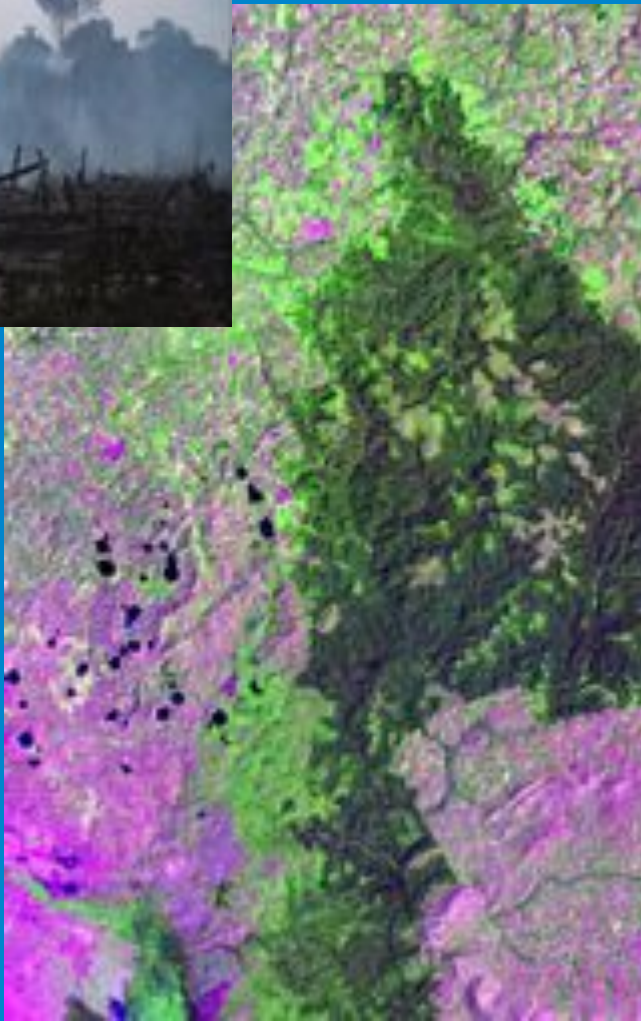






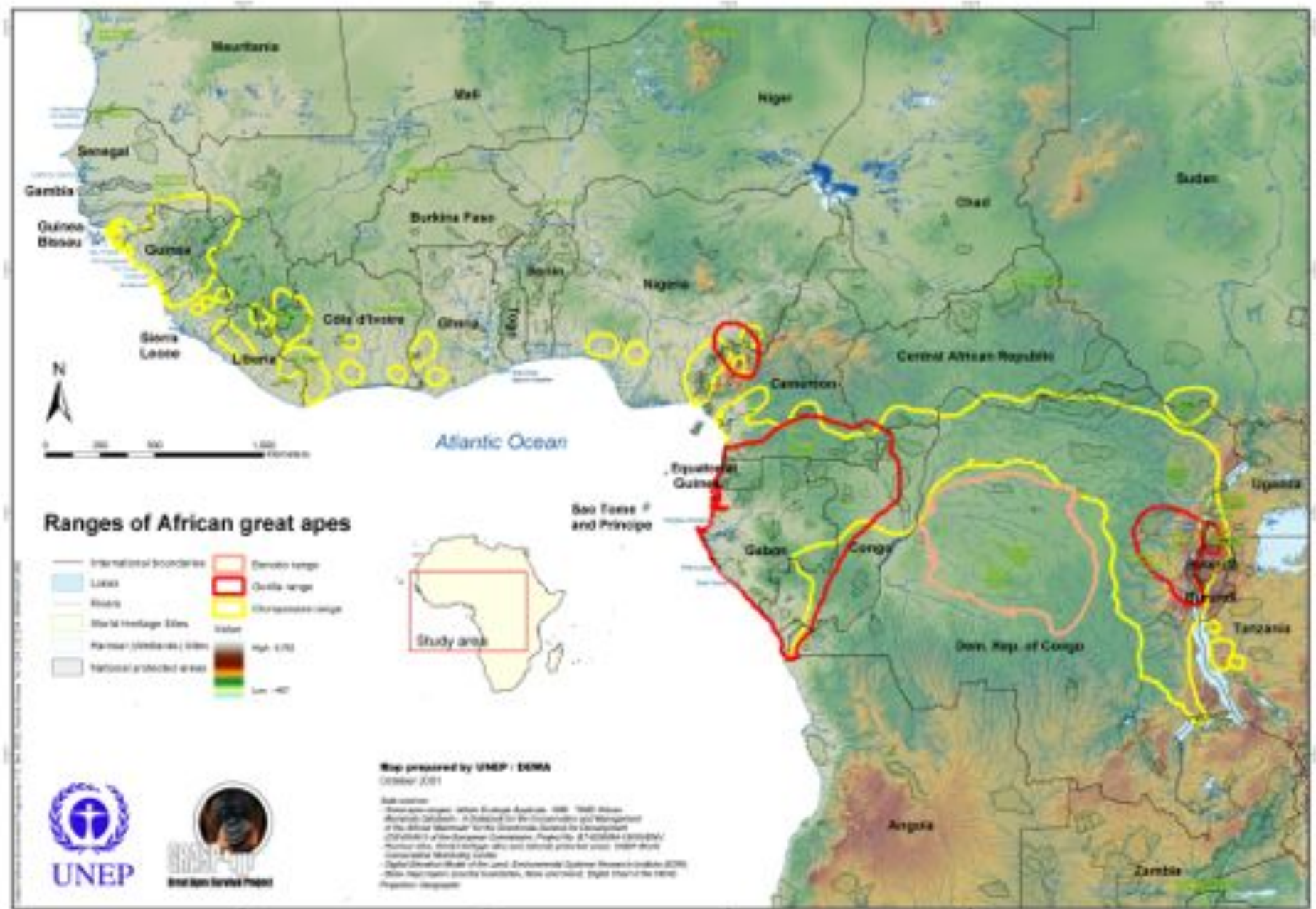














# Yellowstone to Yukon Region







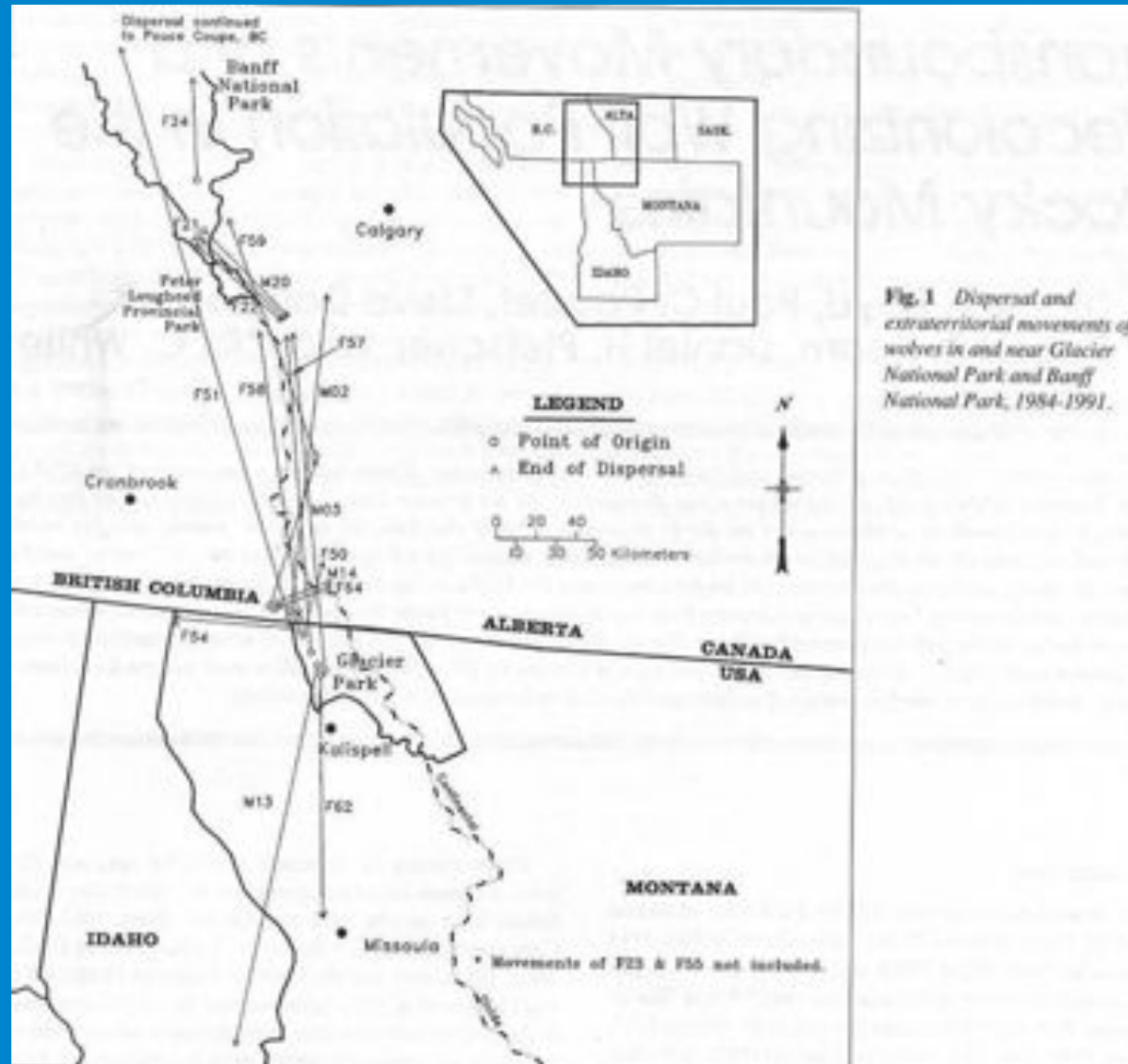
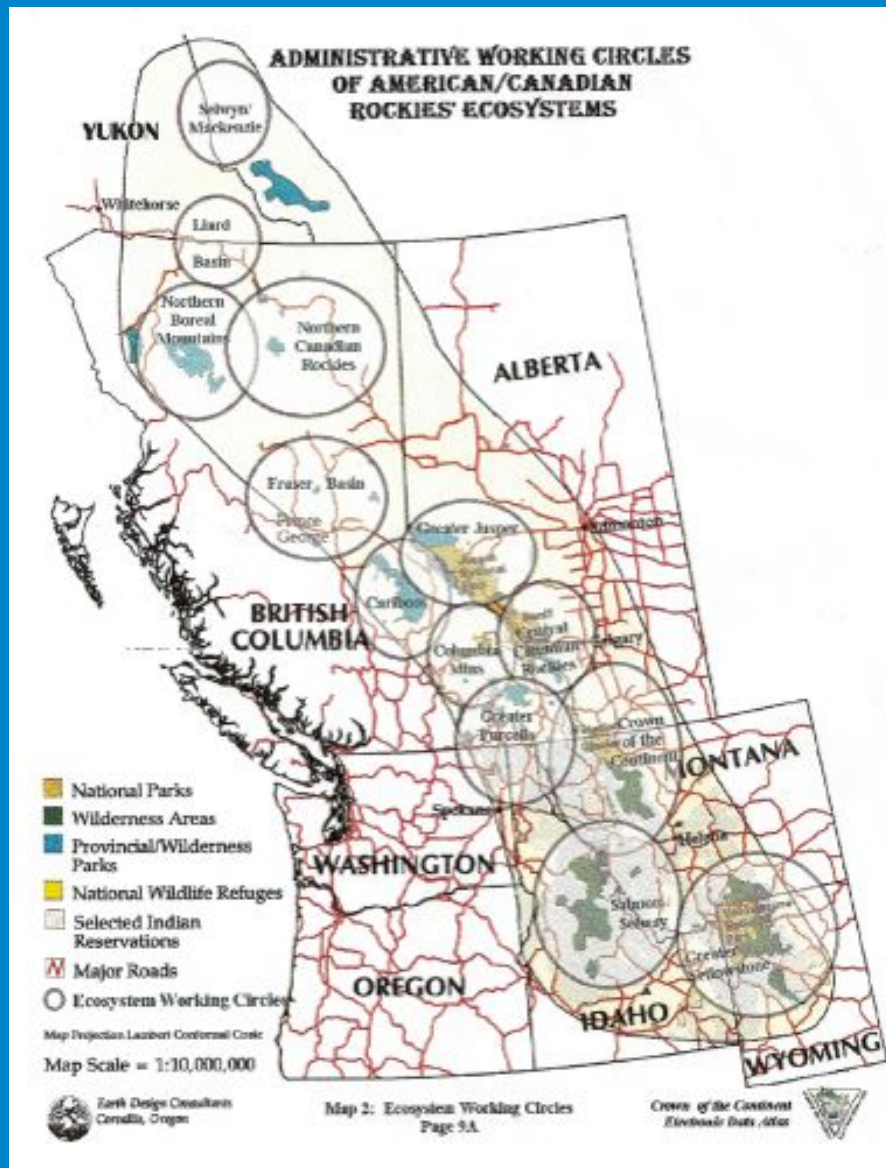


Fig. 1 Dispersal and extraterritorial movements of wolves in and near Glacier National Park and Banff National Park, 1984-1991.

Boyd, D. K., Paquet, P. C., Donelon, S., Ream, R. R., Pletscher, D. H., & White, C. C. (1995). Transboundary movements of a recolonizing wolf population in the Rocky Mountains. *Ecology and conservation of wolves in a changing world*, 135.



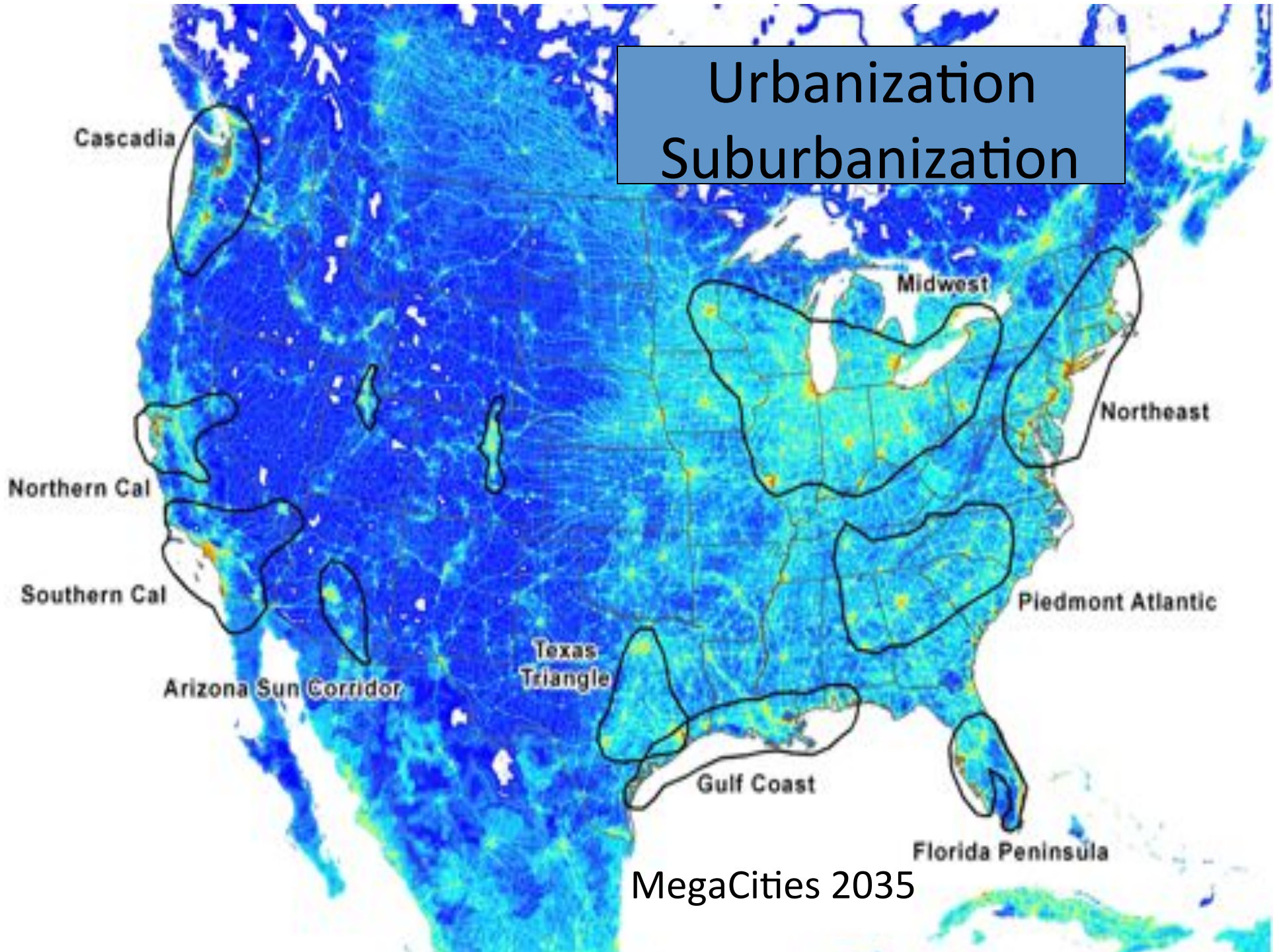








# Urbanization Suburbanization



MegaCities 2035



## Approaching a state shift in Earth's biosphere

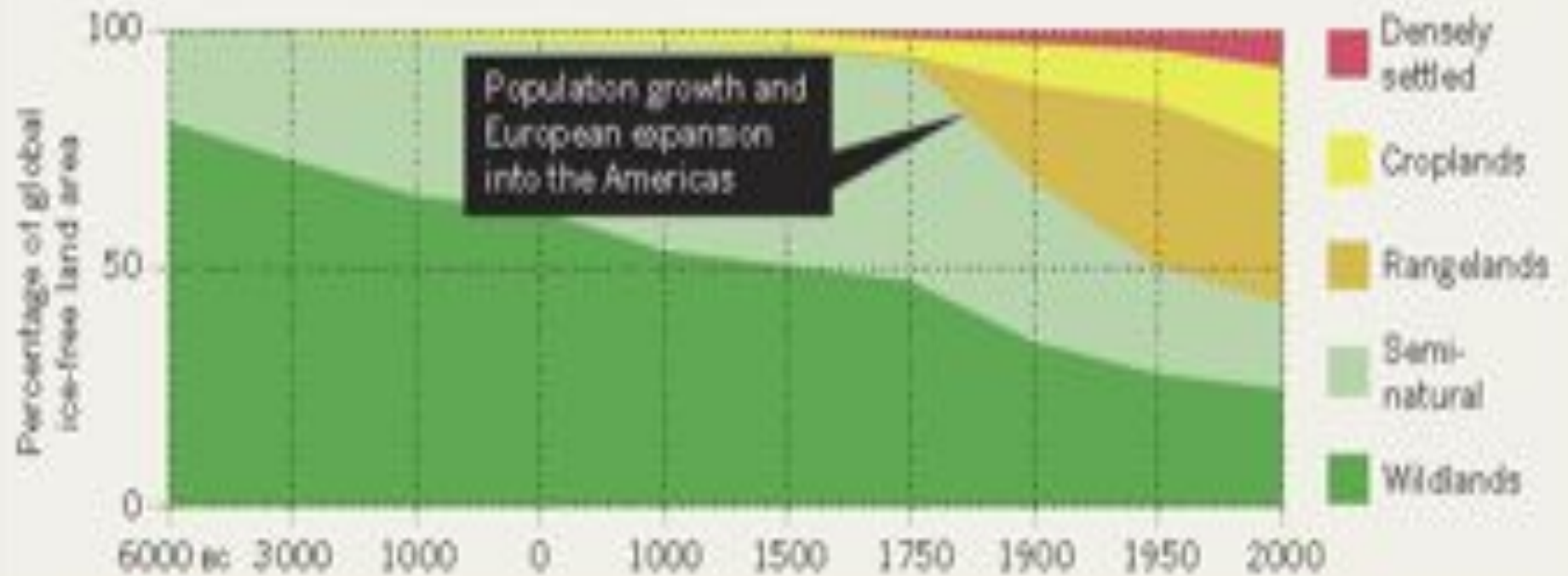
Anthony D. Barnosky<sup>1,2,3</sup>, Elizabeth A. Hadly<sup>4</sup>, Jordi Bascompte<sup>5</sup>, Eric L. Berlow<sup>6</sup>, James H. Brown<sup>7</sup>, Mikael Fortelius<sup>8</sup>, Wayne M. Getz<sup>9</sup>, John Harte<sup>9,10</sup>, Alan Hastings<sup>11</sup>, Pablo A. Marquet<sup>12,13,14,15</sup>, Neo D. Martinez<sup>16</sup>, Arne Mooers<sup>17</sup>, Peter Roopnarine<sup>18</sup>, Geerat Vermeij<sup>19</sup>, John W. Williams<sup>20</sup>, Rosemary Gillespie<sup>9</sup>, Justin Kitzes<sup>9</sup>, Charles Marshall<sup>1,2</sup>, Nicholas Matzke<sup>1</sup>, David P. Mindell<sup>21</sup>, Eloy Revilla<sup>22</sup> & Adam B. Smith<sup>23</sup>

Localized ecological systems are known to shift abruptly and irreversibly from one state to another when they are forced across critical thresholds. Here we review evidence that the global ecosystem as a whole can react in the same way and is approaching a planetary-scale critical transition as a result of human influence. The plausibility of a planetary-scale 'tipping point' highlights the need to improve biological forecasting by detecting early warning signs of critical transitions on global as well as local scales, and by detecting feedbacks that promote such transitions. It is also necessary to address root causes of how humans are forcing biological changes.



## TRANSFORMATION OF THE BIOSPHERE

The effects of human intervention are now apparent on more than half of Earth's ice-free land mass.



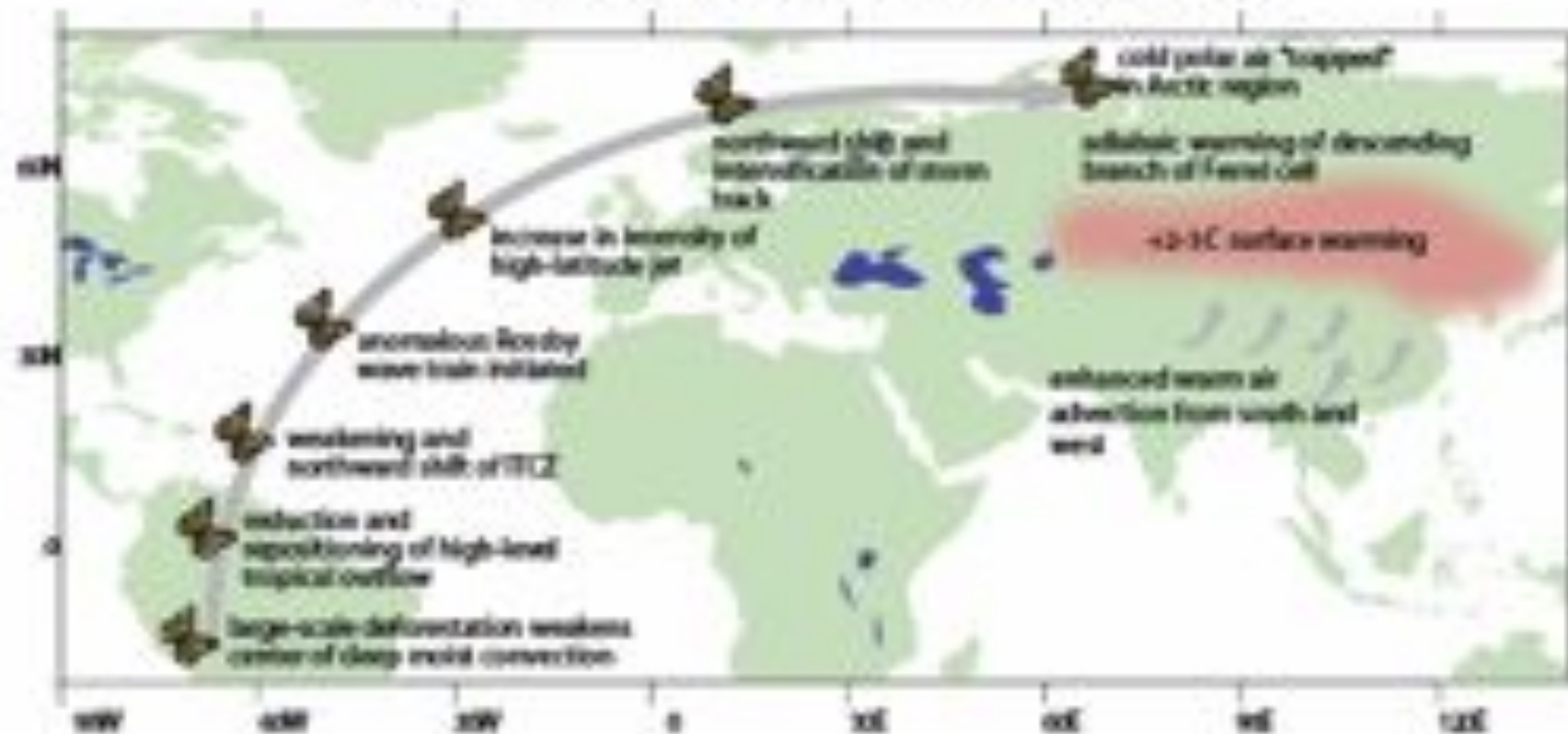




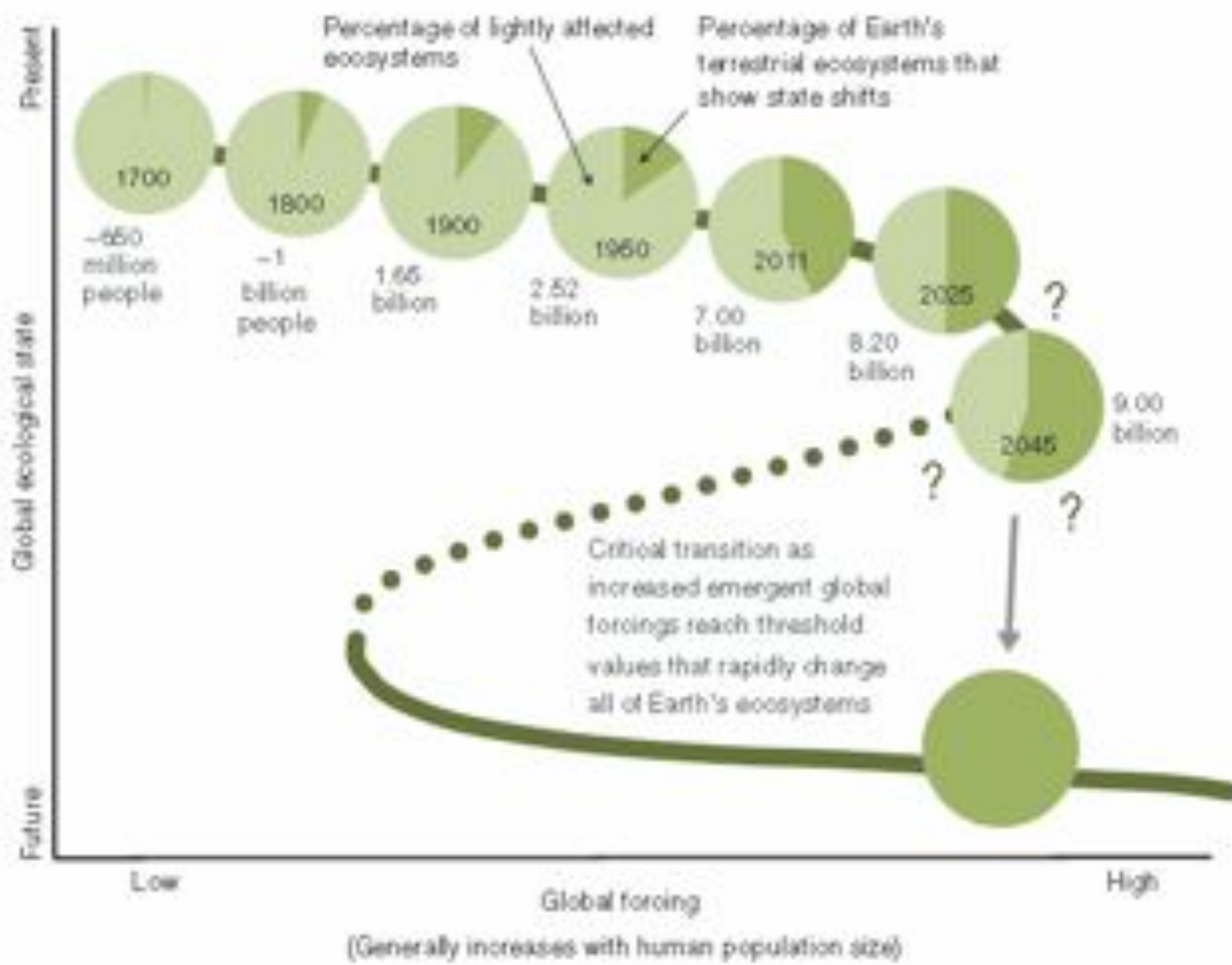
## Qingdao China



## Tropical-Extratropical Teleconnection Mechanism

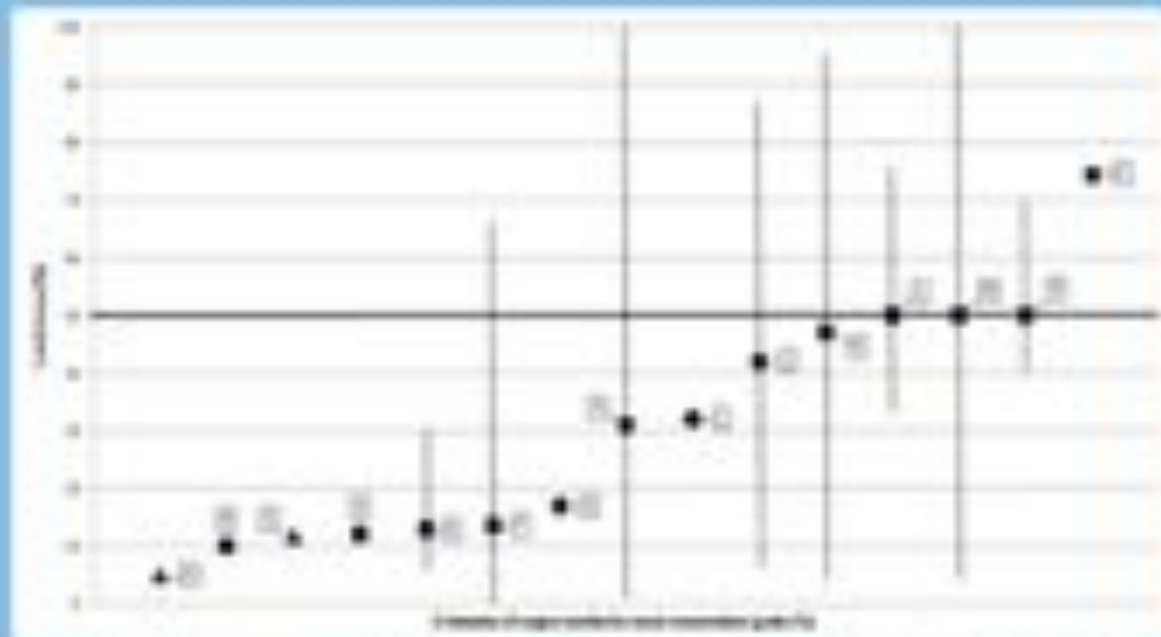


Snyder, P. K., C. Delire, and J. A. Foley. 2004a. Evaluating the influence of different vegetation biomes on the global climate. *Climate Dynamics* 23:279-302.





# Bolder Thinking for Conservation



How much is enough? Estimates of percentage of land required for conserving biodiversity. Current protected areas and policy-driven estimates tend to be smaller (left portion of graph) than science-based estimates (right portion of graph).

A Brooks et al. 2004; B Myers 1979; Miller 1984; C Brooks et al. 2004; D Brundtland Commission 1987; E Swarcara et al. 2005; F Rodrigues and Gaston 2001; G Naiman 2010; H Swarcara et al. 2005; I Naiman 2010; J Swarcara et al. 2005; K Schmiegelow et al. 2006 (n=24); L Soule and Sanjayan 1998; M Noss and Cooperrider 1994; N Ceballos et al. 2011; O Rodrigues and Gaston 2001.

C. Davis and G. Tabor in Noss et al. *J. Cons. Bio.* 2012 (in press).



## Large Landscape Conservation: A Strategic Framework for Policy and Action



MATTHEW MCKINNEY, LYNN SCARLETT, AND DANIEL KEMMIS

## Taking Conservation to Scale: The Challenge of Working Across Boundaries

# Large Scale Conservation



**Continental Connectivity**



# Landscape Conservation Cooperatives



## Landscape Conservation Cooperatives

- |   |                                   |                                     |                                  |
|---|-----------------------------------|-------------------------------------|----------------------------------|
| 1. Appalachian                              | 7. Great Plains                   | 13. Plains and Prairie Potholes     | 19. Northwestern Interior Forest |
| 2. California                               | 8. Gulf Coast Prairie             | 14. South Atlantic                  | 20. Western Alaska               |
| 3. Desert                                   | 9. Gulf Coastal Plains and Ozarks | 15. Southern Rockies                | 21. Pacific Islands              |
| 4. Eastern Tallgrass Prairie and Big Rivers | 10. North Atlantic                | 16. Upper Midwest and Great Lakes   | 22. Caribbean                    |
| 5. Great Basin                              | 11. North Pacific                 | 17. Aleutian and Bering Sea Islands | Undesignated                     |
| 6. Great Northern                           | 12. Peninsular Florida            | 18. Andic                           |                                  |

Map of the United States showing the locations of the Landscape Conservation Cooperatives (LCCs).  
 Prepared by: Peter A. Bock, 1998, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025  
 Map Date: 1/21/2025

## CONNECTING PRACTITIONERS WORKING AT THE LARGE LANDSCAPE SCALE

### INTERACTIVE MAP/ PARTNER LOCATOR



### WORKING GROUPS

Working Groups design and carry out projects and activities that address the goals of the Network.

The **Policy Working Group** is focused on developing consensus policy recommendations for federal actions on landscape conservation.

The **Capacity Building Working Group's** objective is to identify and share the skills, tools, and knowledge to effectively work at the large landscape scale.

The **Communications Working Group** aims to develop and implement an effective strategy for regular communication with and among Network members, including efforts to grow the Network in its program vision, goals, and activities, and in the recruitment of new members.

### TOOLS AND RESOURCES

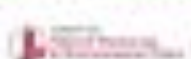
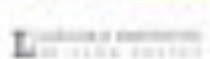


### MEETING AND EVENTS

Members of the Network are invited to meetings specifically focused on addressing the needs and interests of practitioners working at the large landscape scale. Network meetings also provide an opportunity for members to shape the future of the Network.

The Practitioners' Network website also provides a listing of upcoming meetings and events that are relevant to people and organizations working at the large landscape scale.

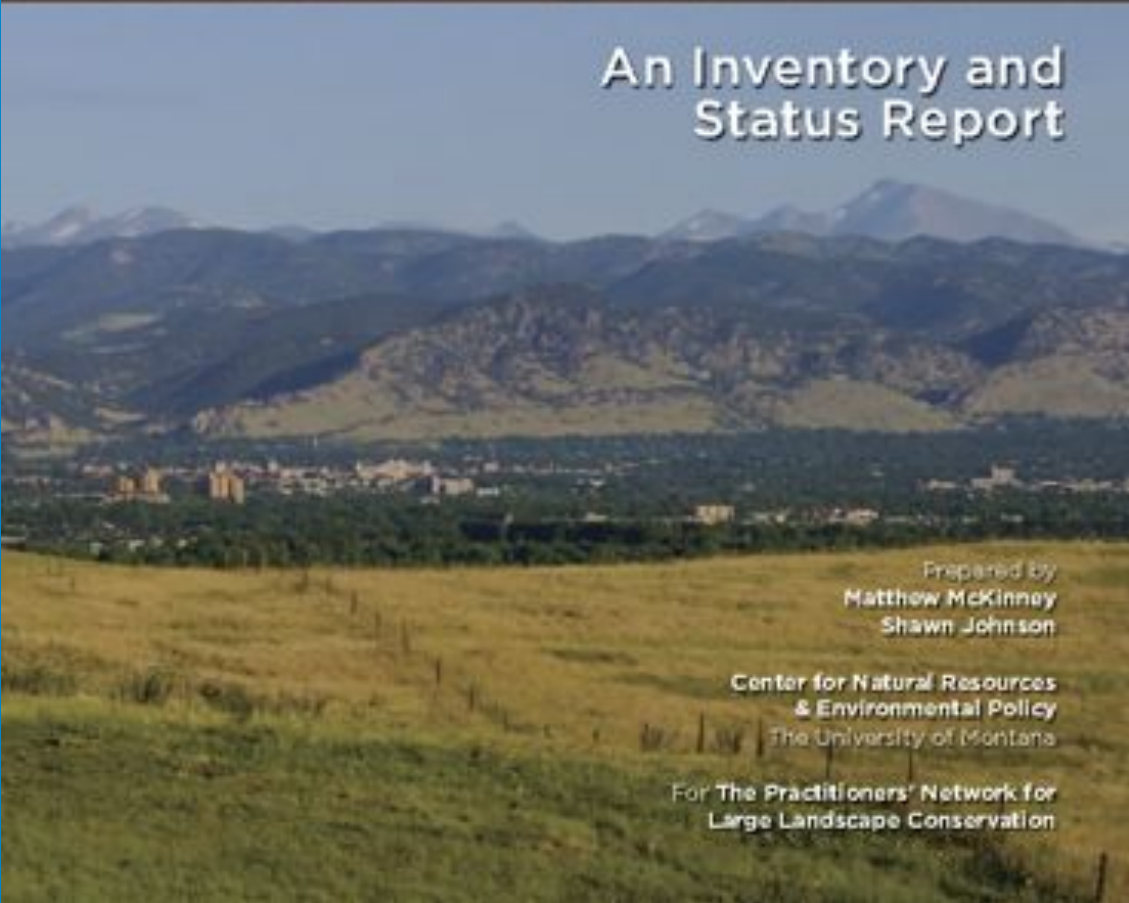
The Practitioners' Network thanks the following organizations for their support.







# Large Landscape Conservation in the Rocky Mountain West



## An Inventory and Status Report

Prepared by  
Matthew McKinney  
Shawn Johnson

Center for Natural Resources  
& Environmental Policy  
The University of Montana

For The Practitioners' Network for  
Large Landscape Conservation

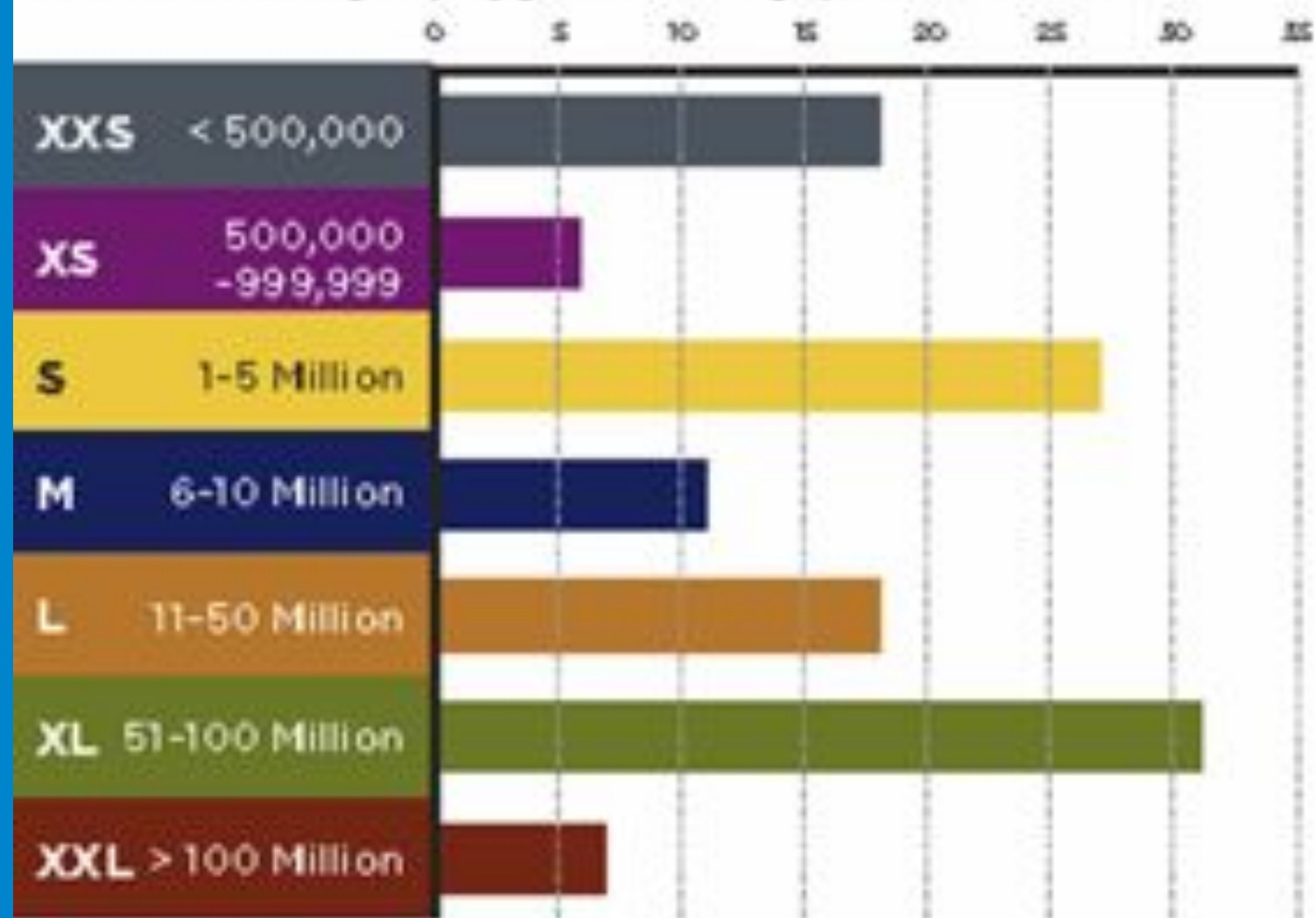


Figure 10: Large Landscape Conservation Initiatives in the Rocky Mountain West (locations are approximate)



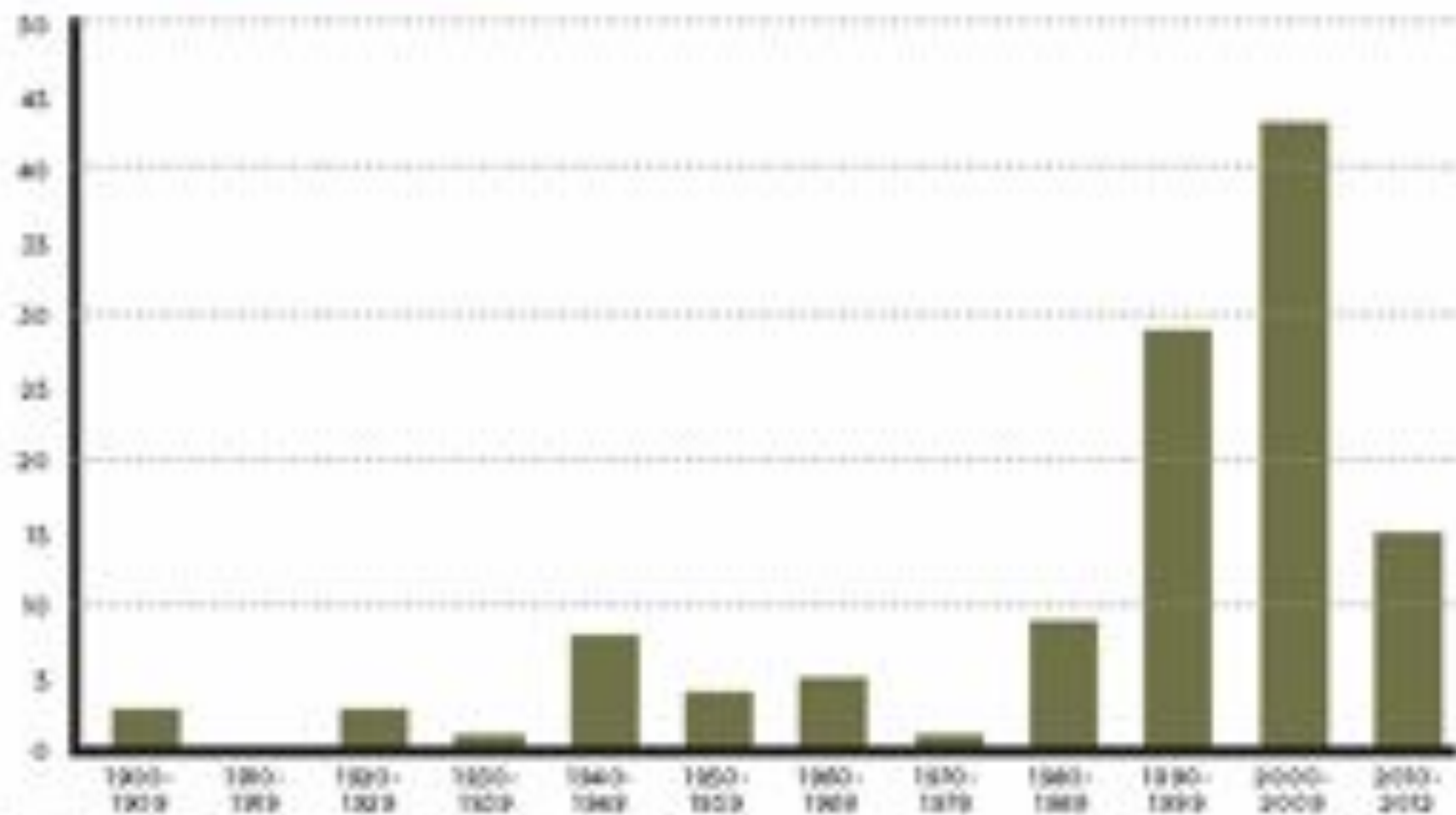
Figure 12: **Geographic Scale (in Acres)**

Colors match the legend for figure 10, the map of LLC initiatives



Source: Center for Natural Resources & Environmental Policy

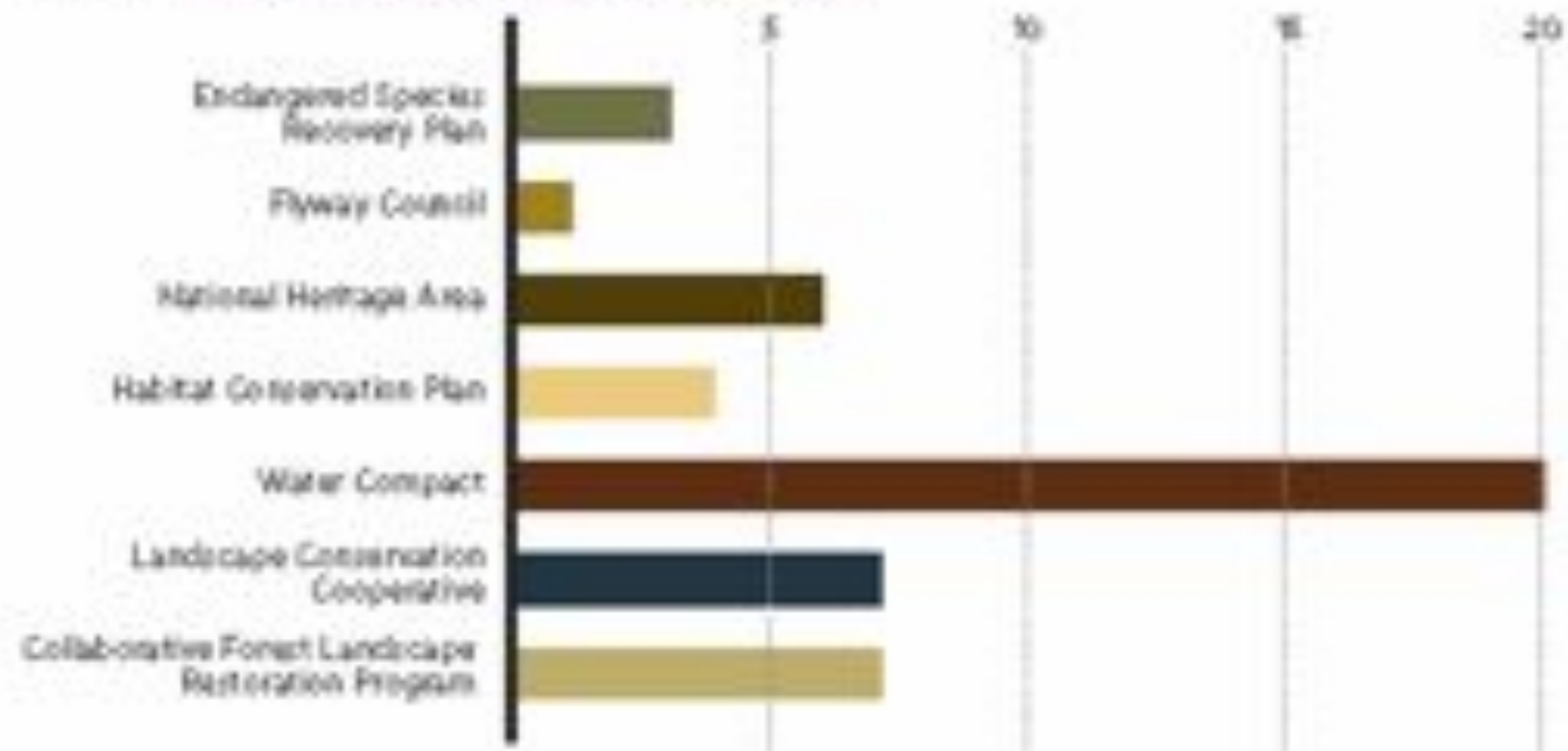
Figure 11: Year Established



Source: Center for Natural Resources & Environmental Policy

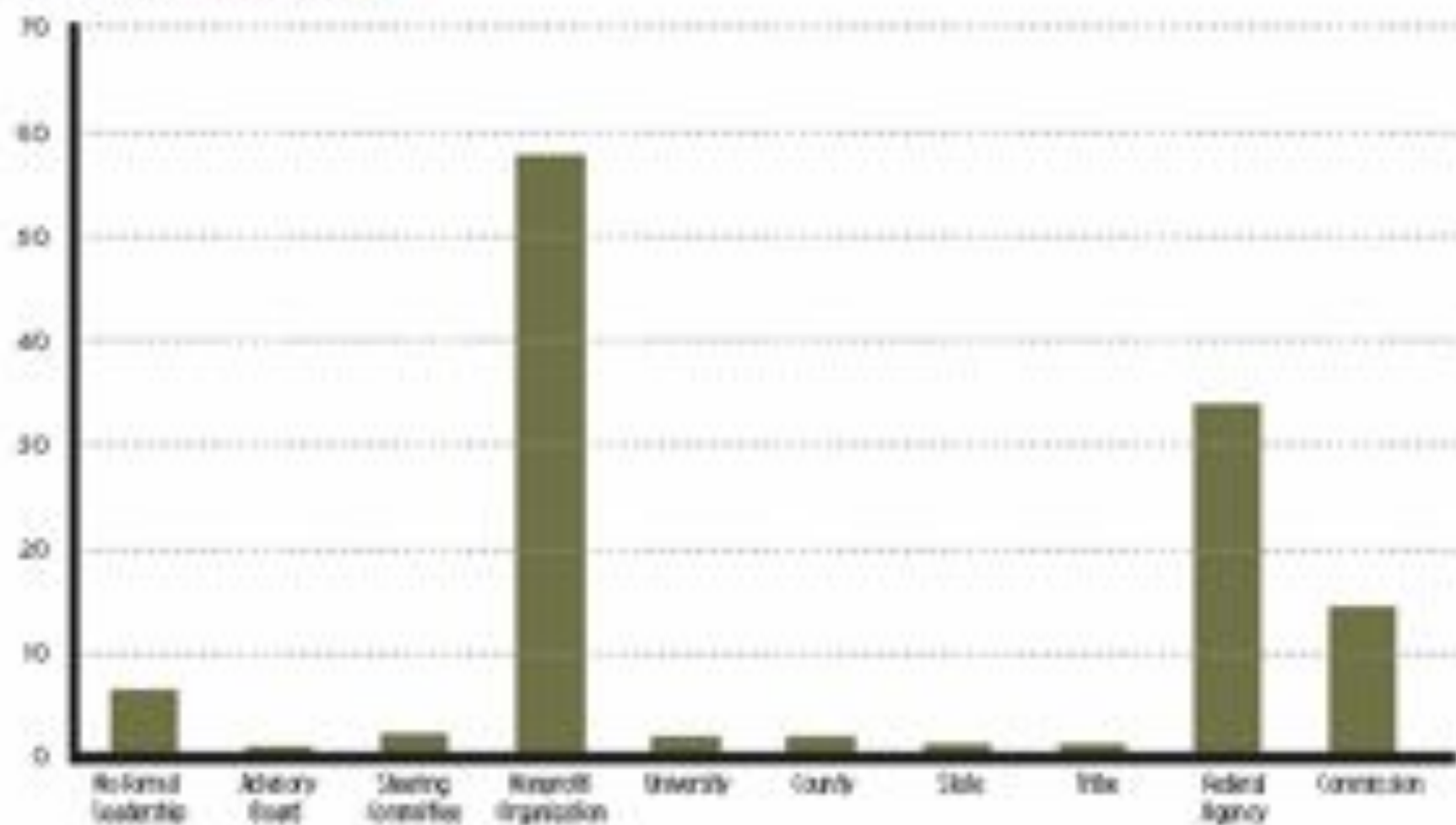


Figure 17: Formally Authorized Initiatives



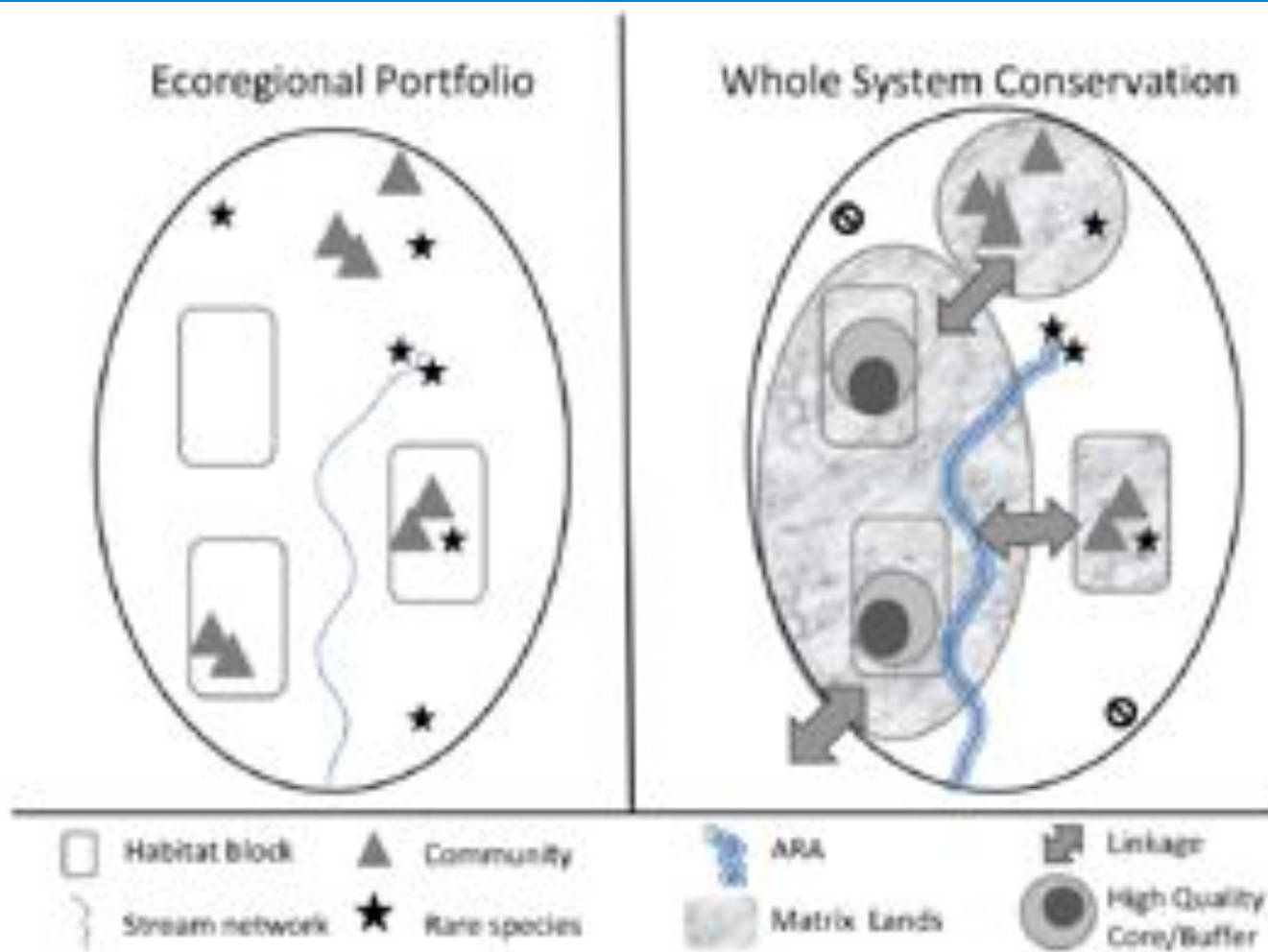
Source: Center for Natural Resources & Environmental Policy

Figure 18: **Leadership**



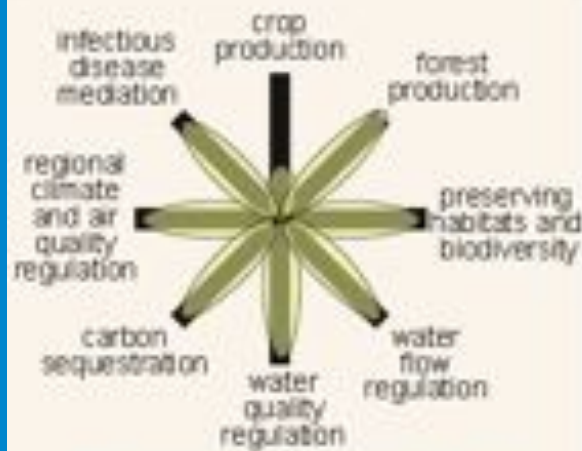
Source: Center for Natural Resources & Environmental Policy

# Whole System Conservation



Courtesy Craig Groves, TNC

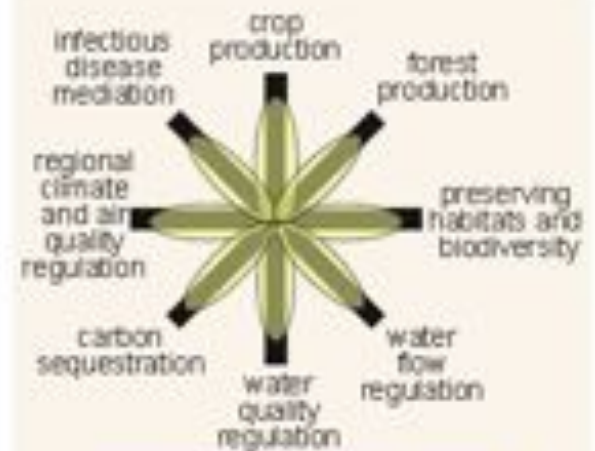




natural ecosystem



intensive cropland

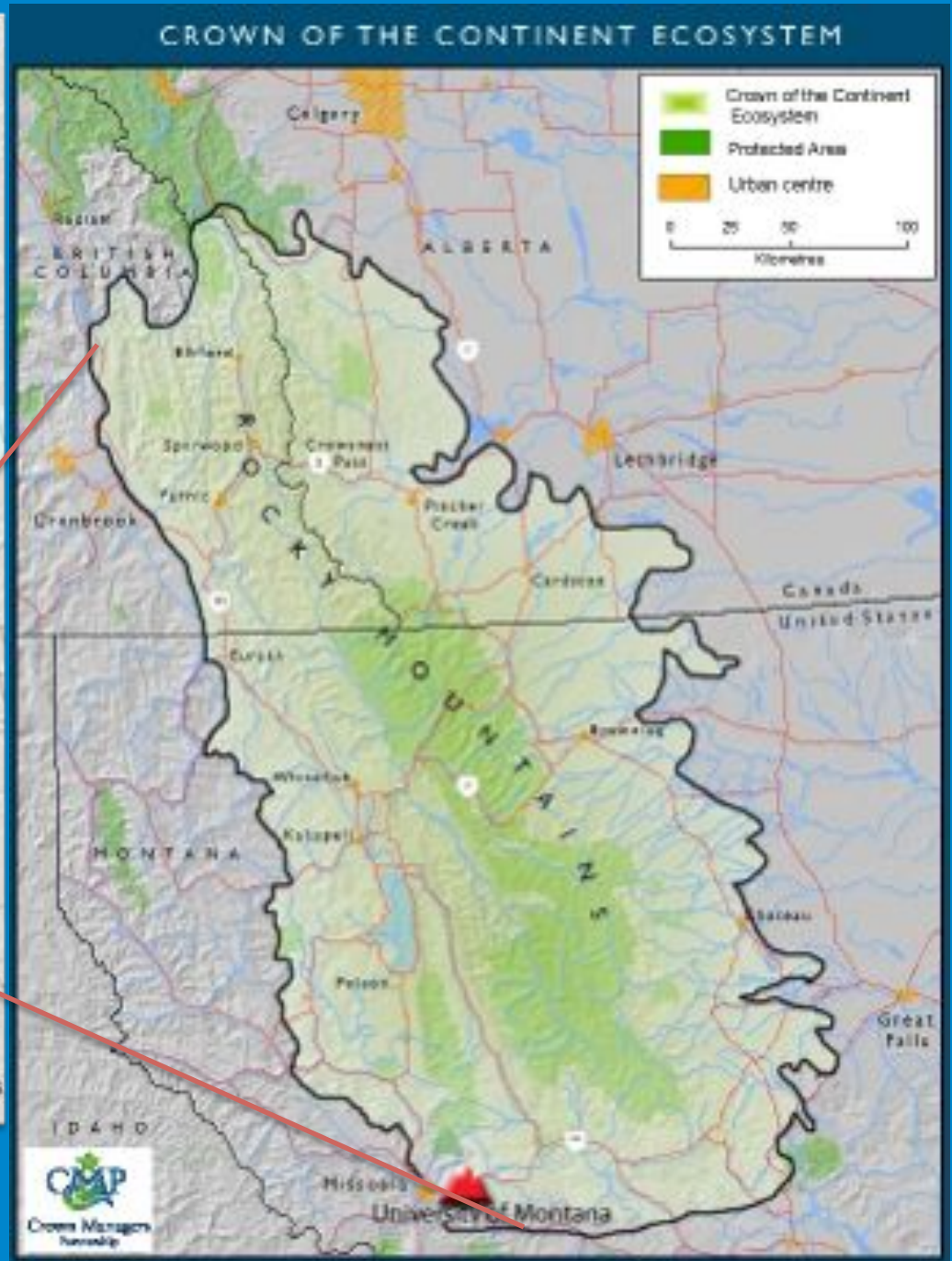


cropland with restored ecosystem services

## Global Consequences of Land Use

Jonathan A. Foley,<sup>1\*</sup> Ruth DeFries,<sup>2</sup> Gregory P. Asner,<sup>3</sup> Carol Barford,<sup>1</sup> Gordon Bonan,<sup>4</sup> Stephen R. Carpenter,<sup>5</sup> F. Stuart Chapin,<sup>6</sup> Michael T. Coe,<sup>1†</sup> Gretchen C. Daily,<sup>7</sup> Holly K. Gibbs,<sup>1</sup> Joseph H. Helkowski,<sup>1</sup> Tracey Holloway,<sup>1</sup> Erica A. Howard,<sup>1</sup> Christopher J. Kucharik,<sup>1</sup> Chad Monfreda,<sup>1</sup> Jonathan A. Patz,<sup>1</sup> I. Colin Prentice,<sup>8</sup> Navin Ramankutty,<sup>1</sup> Peter K. Snyder<sup>9</sup>

22 JULY 2005 VOL 309 SCIENCE





# Connecting Social Scale with Ecological Scale

How can we scale up participatory involvement in conservation to the landscape scale.









Thank you  
for your purchase

**SWISS**

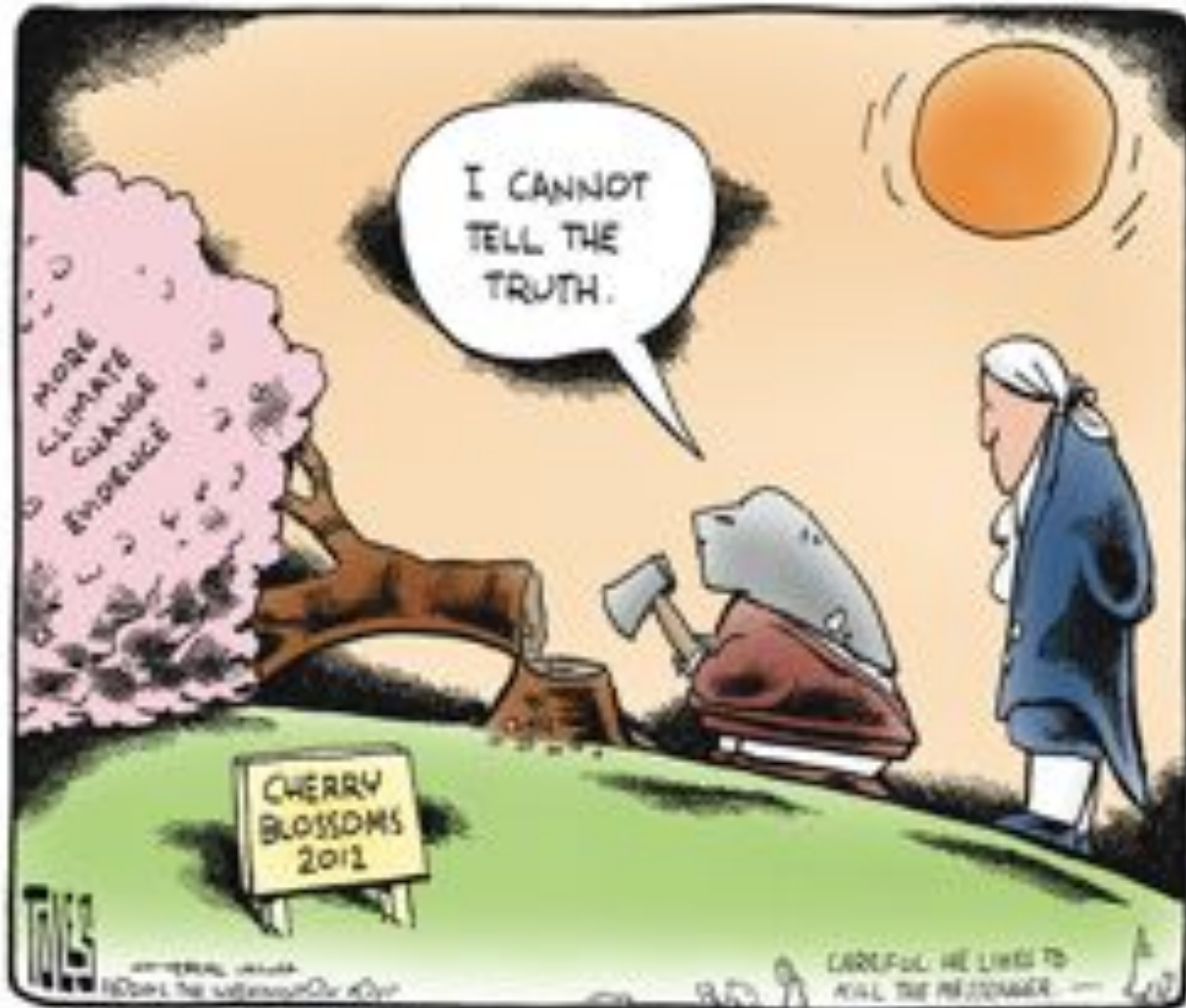
GRADE A • PASTEURIZED • HOMOGENIZED

HAVE YOU SEEN ME?



INGREDIENTS: MILK, VITAMIN D3.  
CONTAINS 0.2% MILKfat.  
KEEP REFRIGERATED.





7-14-12

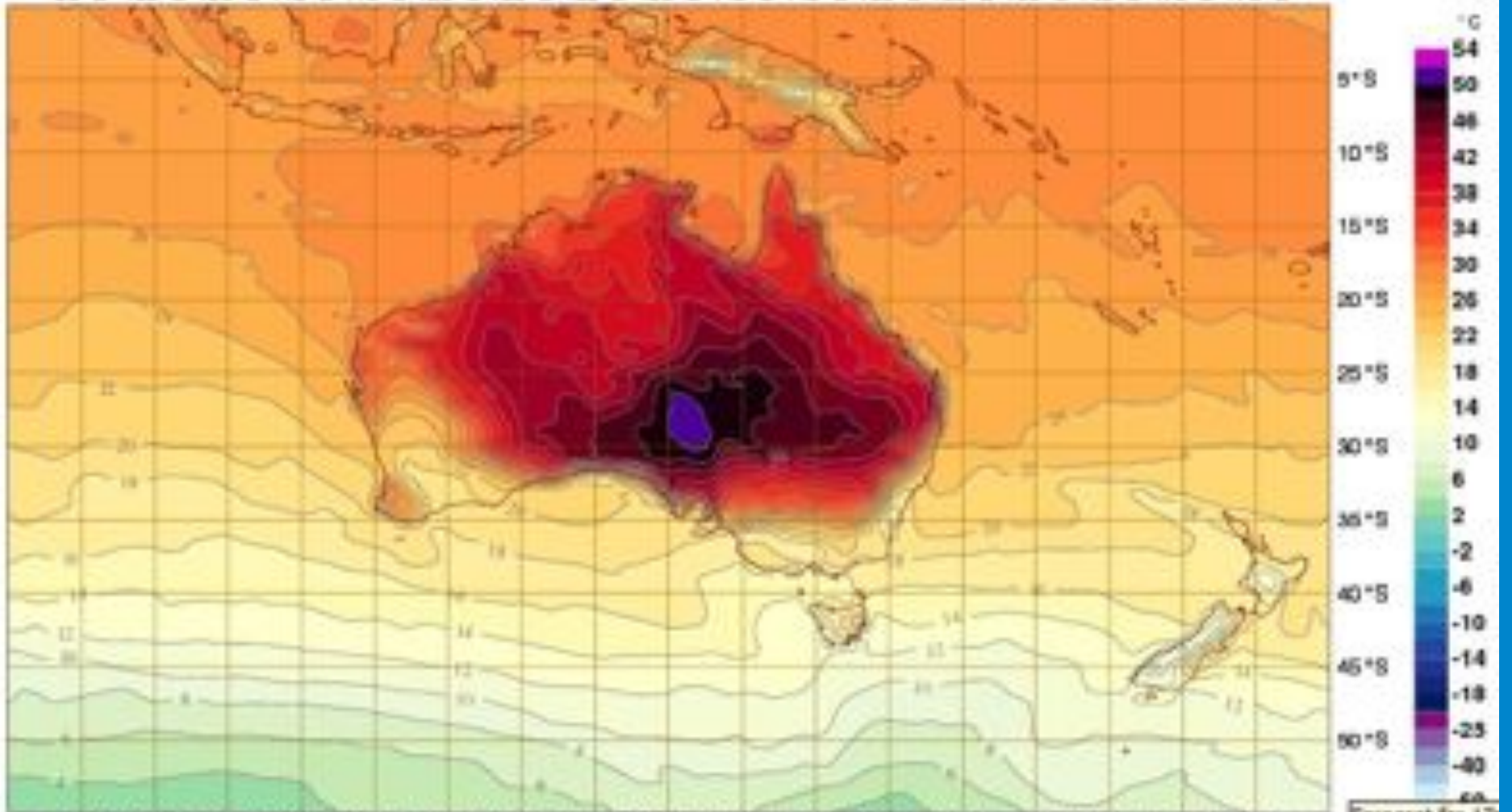


**Western Governors Association Logo**

Screen Temperature  
Valid 06UTC Mon 14 Jan 2013

ACCESS-Global  
t+162

95°E 100°E 105°E 110°E 115°E 120°E 125°E 130°E 135°E 140°E 145°E 150°E 155°E 160°E 165°E 170°E 175°E

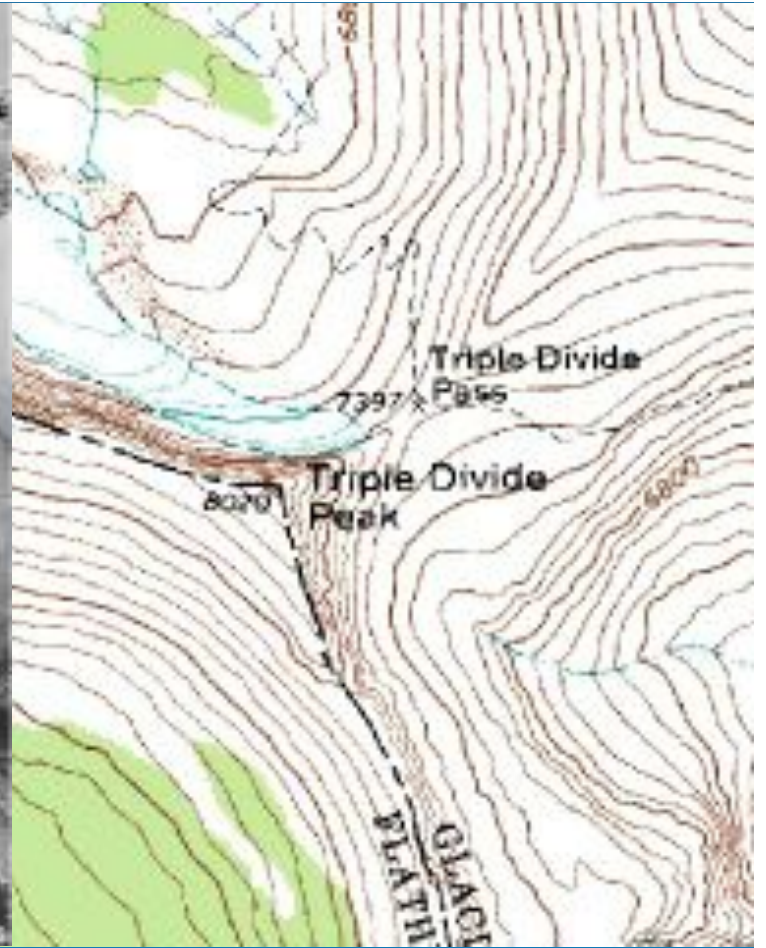
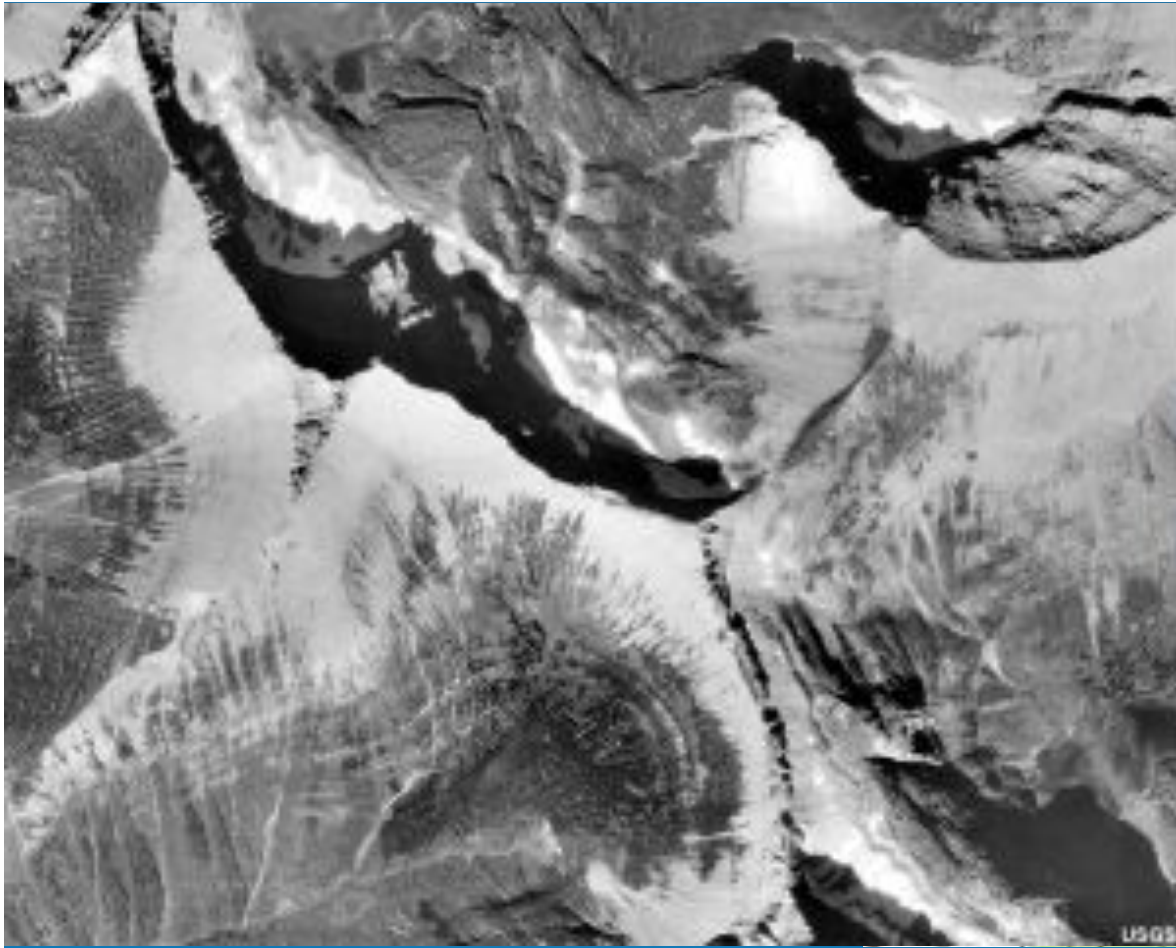


95°E 100°E 105°E 110°E 115°E 120°E 125°E 130°E 135°E 140°E 145°E 150°E 155°E 160°E 165°E 170°E 175°E

© Copyright Commonwealth of Australia 2013, Australian Bureau of Meteorology

Forecast for 17:00 AEDT on Monday 14 January 2013





# Triple Divide Peak

# International River Basins of **NORTH AMERICA**



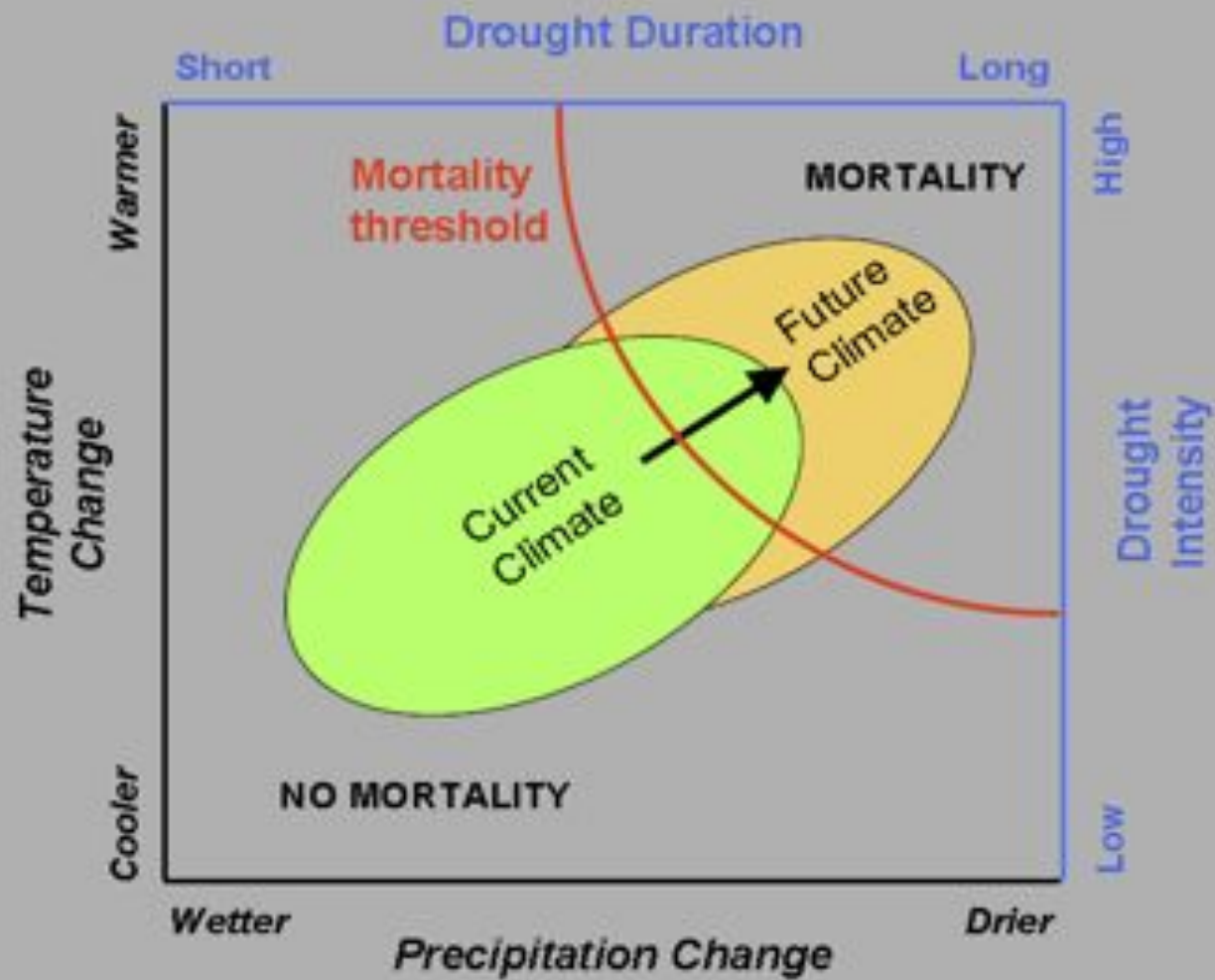






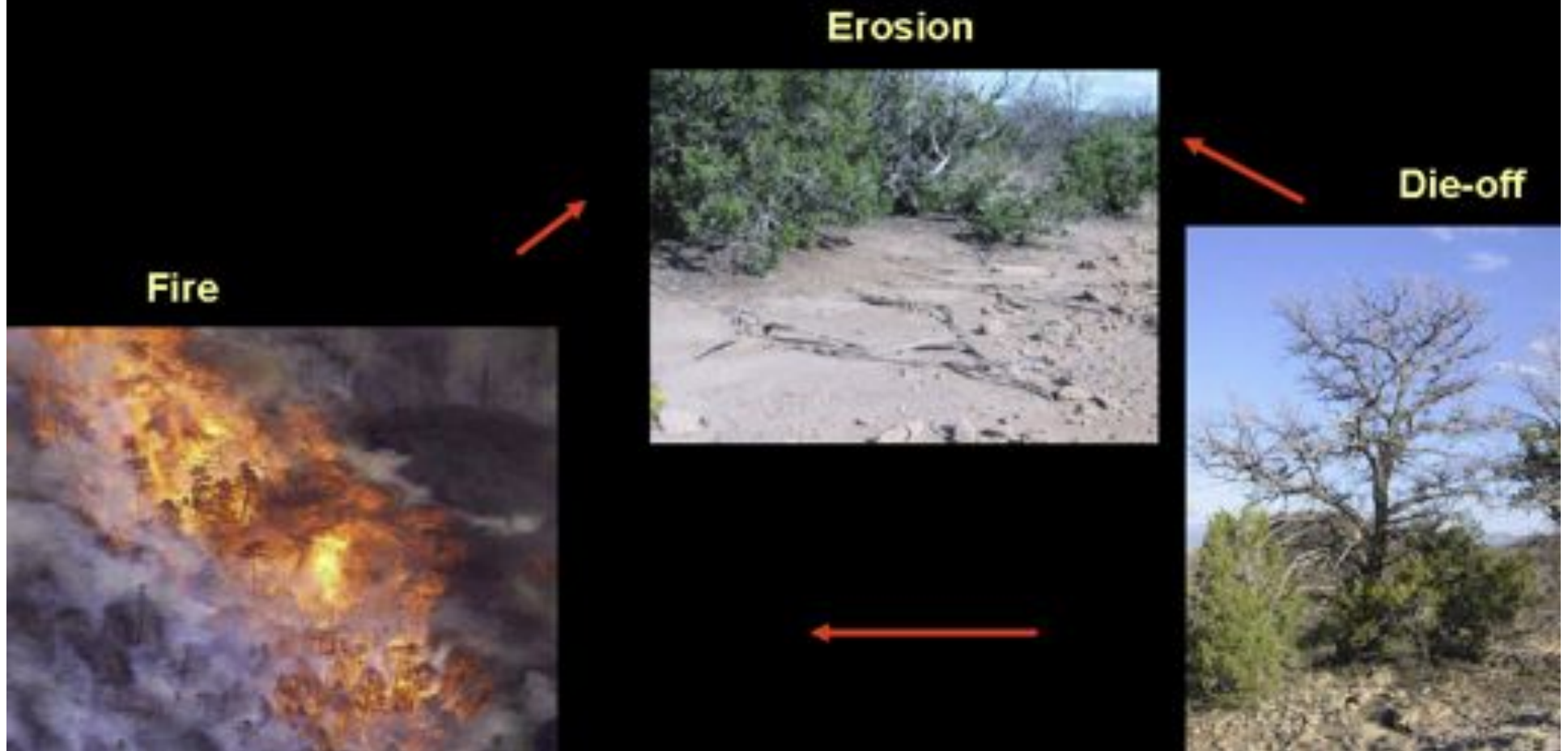


C. Allen et al 2010 "A global overview of drought and heat-induced tree mortality reveals emerging climate change risks for forests", *Forest Ecology and Management*



For example:  
Interactions Among Climate-related disturbance processes

C. Allen et al 2010  
Forest Ecology and Management







## CROWN OF THE CONTINENT ECOSYSTEM



**Campus  
with an Ecosystem**



### Community-based Partnerships

- Castle Special Place Working Group
- 5. Foothills Community Stewardship Initiative
- Oldman River Watershed Group
- Waterton Front Park Project
- Marias River Watershed
- Dupuyer Creek Watershed Group
- Teton River Watershed Group
- Coalition to Protect the Rocky Mountain Front
- Sun River Watershed Group
- Blackfoot Challenge
- Clearwater Resource Council
- Southwestern Crown Collaborative
- Swan Ecosystem Center
- Northwest Connections
- Flathead Lakers
- Mill Creek Watershed Group
- Flathead Basin Commission
- East Kootenay Conservation Program

### Tribes and First Nations

- ▲ Siksika
- ▲ Blood / Kanał
- ▲ Pikani
- ▲ Blackfeet
- ▲ Confederated Salish and Kootenai
- ▲ Tobacco Plains
- ▲ Ktunaxa Nation Council
- ▲ St. Mary's
- ▲ Columbia Lake
- ▲ Kinbasket Shuswap

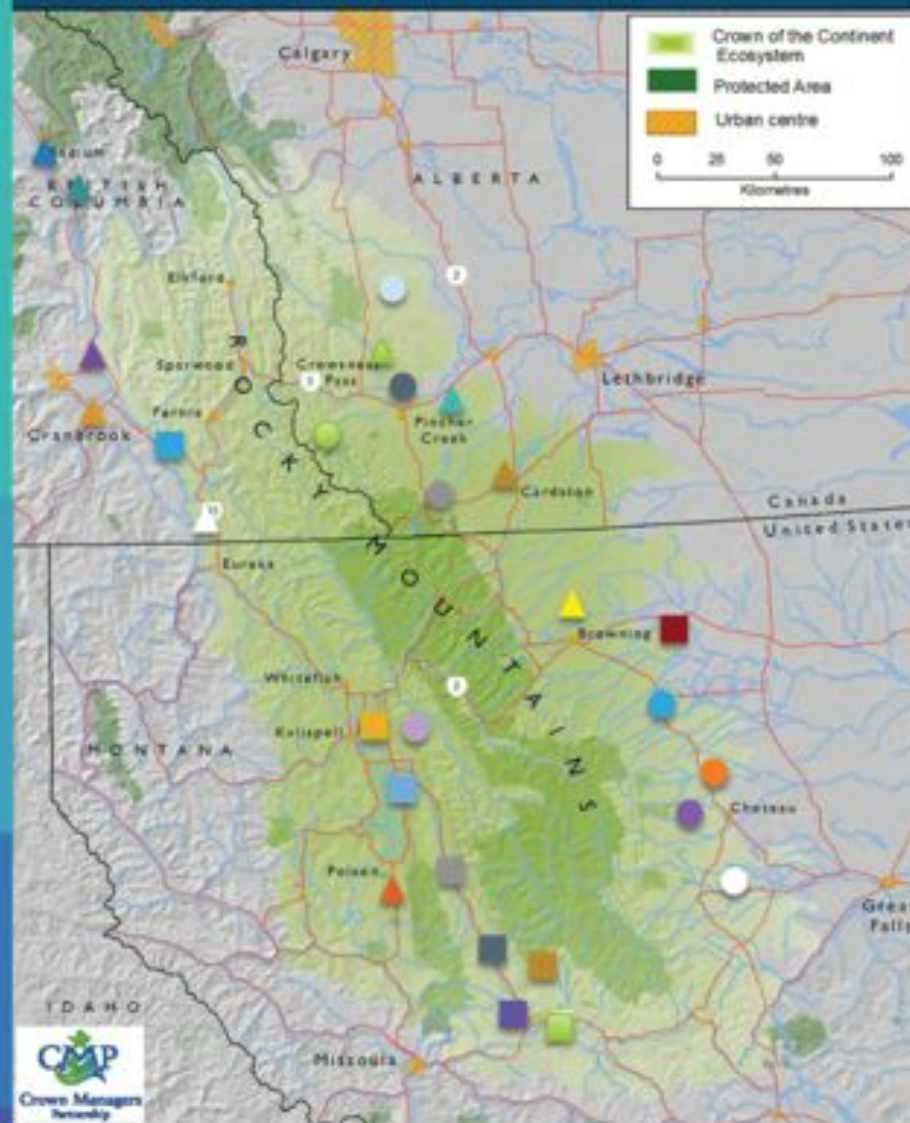
### Crown-wide Initiatives

- COC Ecosystem Education Consortium
- UMIU of Calgary Transboundary Program
- Crown Managers Partnership
- COC Resource Learning Center (GNP)
- Heart of the Rockies
- COC Geotourism Council
- UM COC Initiative
- COC Conservation Initiative

### Larger Regional Efforts

- Great Northern LCC
- Yellowstone to Yukon Conservation Initiative

## CROWN OF THE CONTINENT ECOSYSTEM



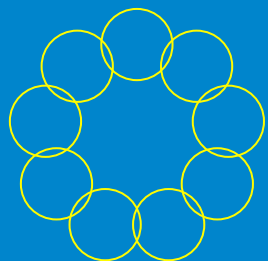


# People









# Roundtable on the Crown of the Continent:

Connecting People to Sustain and Enhance Culture, Community, and Conservation

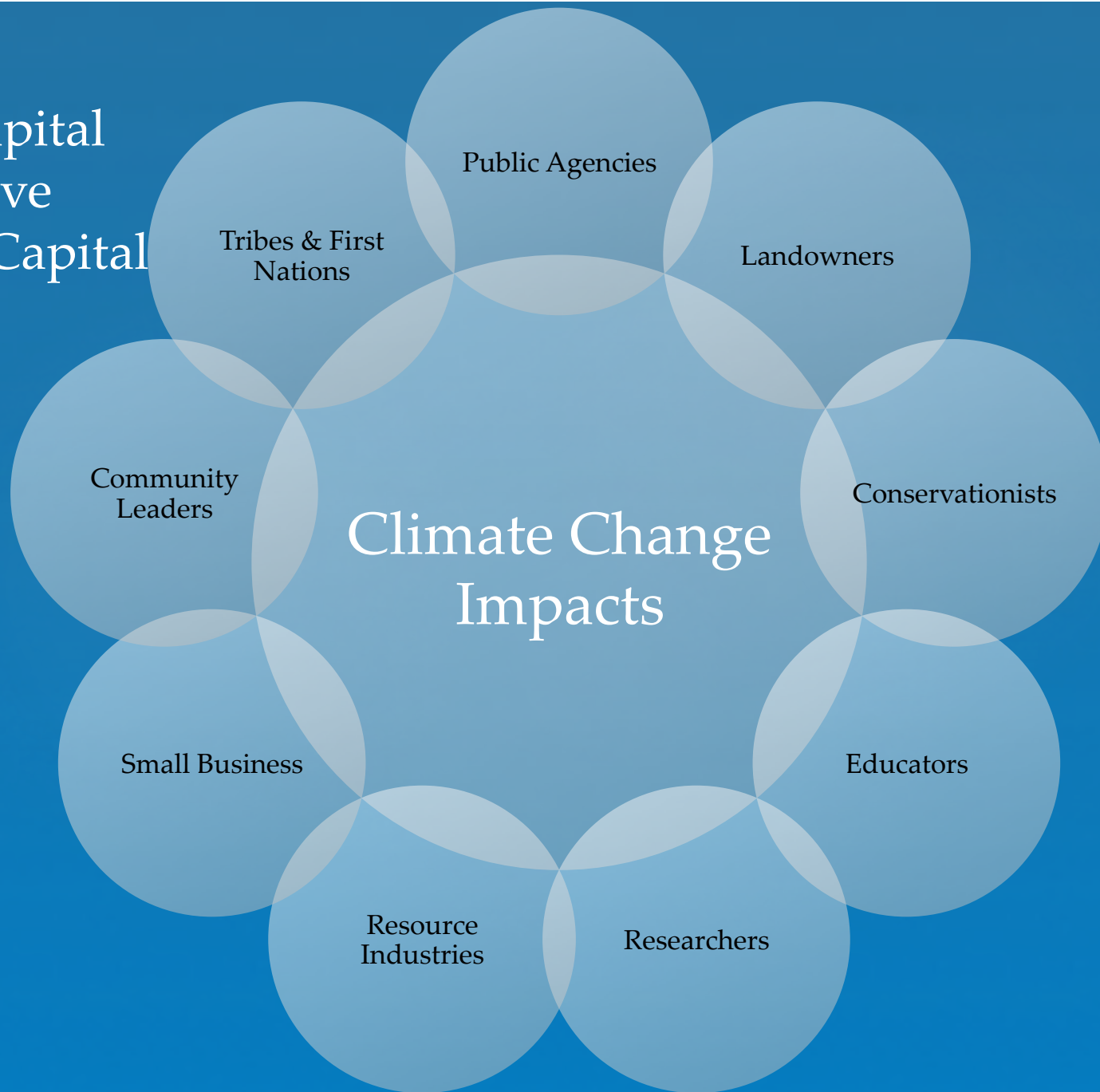


**Network of Networks –  
Tribes, CMP, WLC, CCCI, Geotourism, COCEEC, more**

**WE ARE THE CROWN ROUNDTABLE**



Building  
Social Capital  
to conserve  
Natural Capital





# Connective Tissue



# Roundtable on the Crown of the Continent:

Connecting People to Sustain and Enhance Culture, Community, and Conservation



**What's Our Baseline?** Crown Managers Partnership Ecological Integrity Index: A Baseline Assessment Integrating Trans-boundary Data and Analyzing Landscape-Scale Trend Analysis

**Prototyping Climate Adaptation Forestry** - Empowering rural communities through collaborative and adaptive forestry projects in the Southwestern Crown of the Continent

**Prototyping Climate Adaptation through Large Scale Invasive Species Management** - Community-based conservation in the Southern Crown of the Continent





## Roundtable on the Crown of the Continent:

Connecting People to Sustain and Enhance Culture, Community, and Conservation



**Prototyping Watershed-based Climate Adaptation in Canada – Building Connections and Public Knowledge in the Oldman Watershed**

**Prototyping Watershed-based Climate Adaptation in the U.S. – Sun River and Rocky Mountain Front Watersheds Management Coordination**

**Linking Climate Adaptation Implementation with Ecosystem Services Efforts – A Scan of Ecological Goods and Services Programming in the Crown of the Continent**



## Roundtable on the Crown of the Continent:

Connecting People to Sustain and Enhance Culture, Community, and Conservation



**Building Climate Adaptation Capacity within Indigenous Communities -**  
Climate Adaptation Strategy for the Confederated Salish and Kootenai  
Tribes and Integrating Traditional Ecological Knowledge into Climate  
Adaptation Planning: Blackfeet Community College

**Building Climate Adaptation Capacity and Leadership –** University of  
Montana and Mount Royal College Trans-boundary Initiative



# Roundtable on the Crown of the Continent:

Connecting People to Sustain and Enhance Culture, Community, and Conservation



**Conducting strategic outreach to key policy makers and elected officials** at the local, state, tribal, provincial and federal levels;

**Conducting strategic outreach to key industries and local businesses** in the region;

**Developing a broad-based, coordinated public communications** effort that highlights collective climate adaptation efforts, producing a monthly electronic newsletter;

**Developing and implementing an intentional campaign to expand and engage the Friends of the Crown**



# Convening the 4<sup>th</sup> annual conference on the Crown of the Continent

**September 11 - 13, 2013**



The emerging priorities of the US Forest Service and other federal agencies responsible for implementing President Obama's America's Great Outdoors initiative in the Crown of the Continent.





# Roundtable on the Crown of the Continent:

Connecting People to Sustain and Enhance Culture, Community, and Conservation

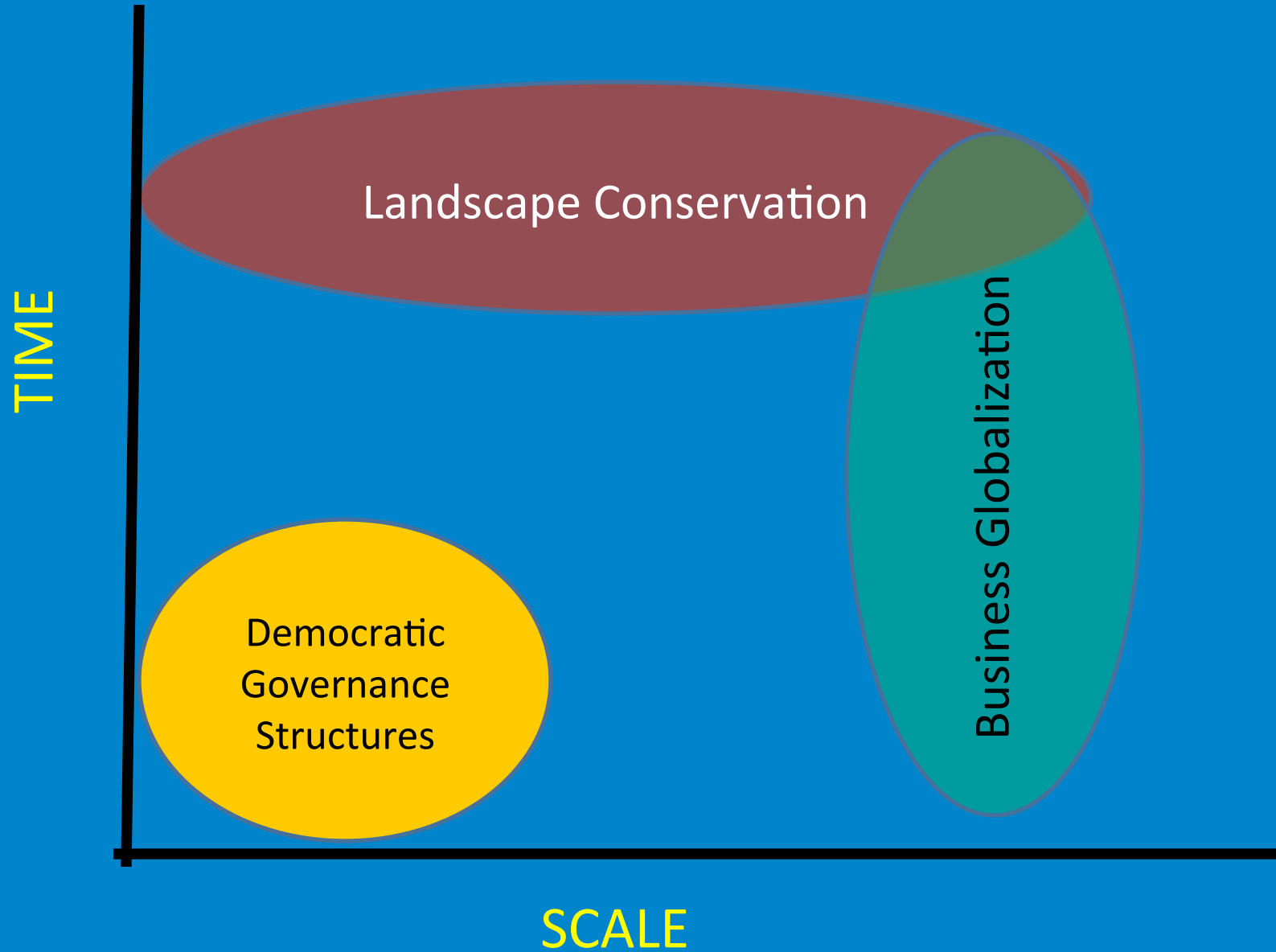


**Prototyping Climate Adaptation Long-term Financing – Sustainable Communities: Designing a Long Term Finance Structure that supports Climate Adaptation Implementation**





Adapted from Joel Cohen



## NGO Initiative



## Working at the Scale that Nature Functions Governmental Initiative





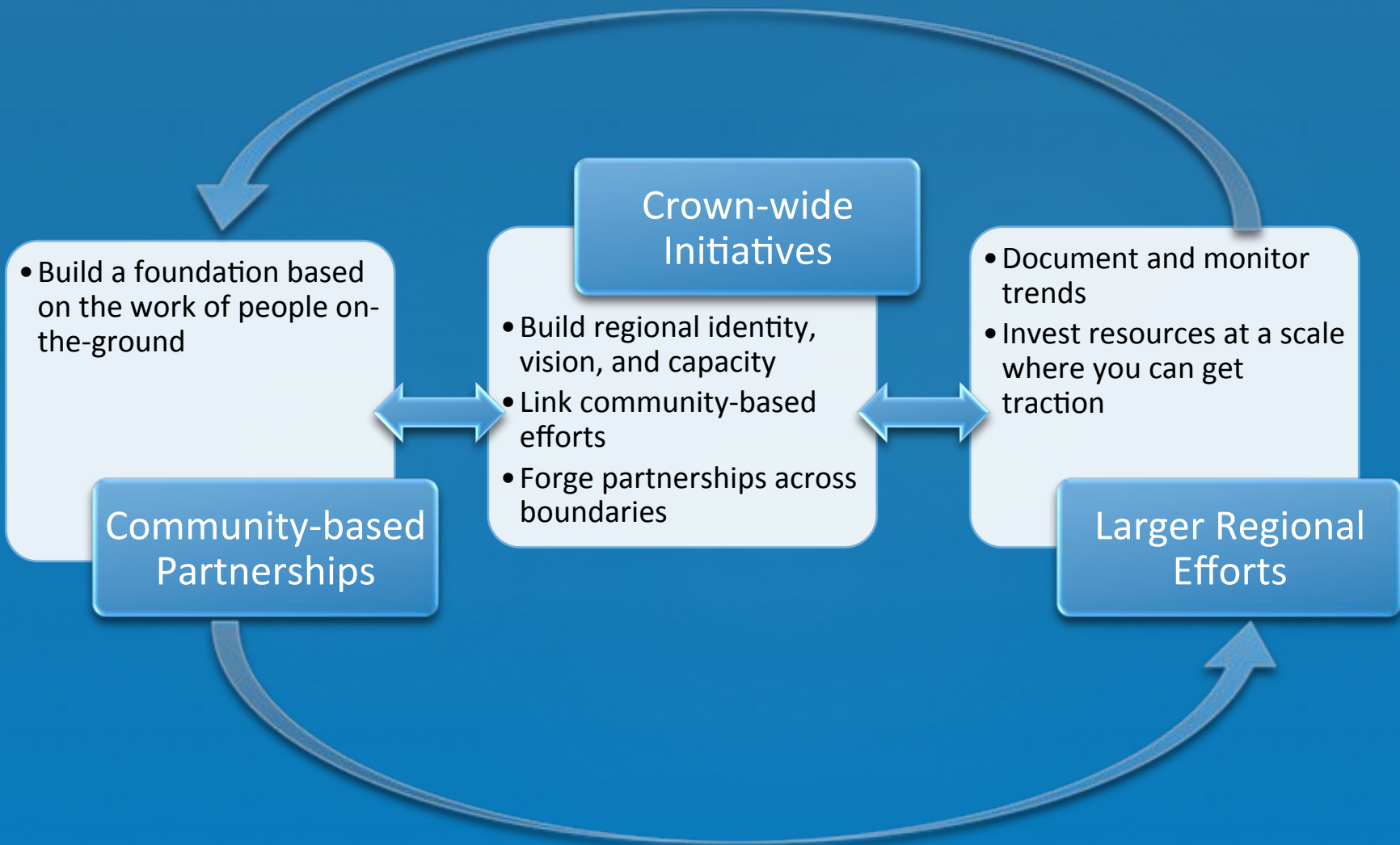
**Continental Scale**

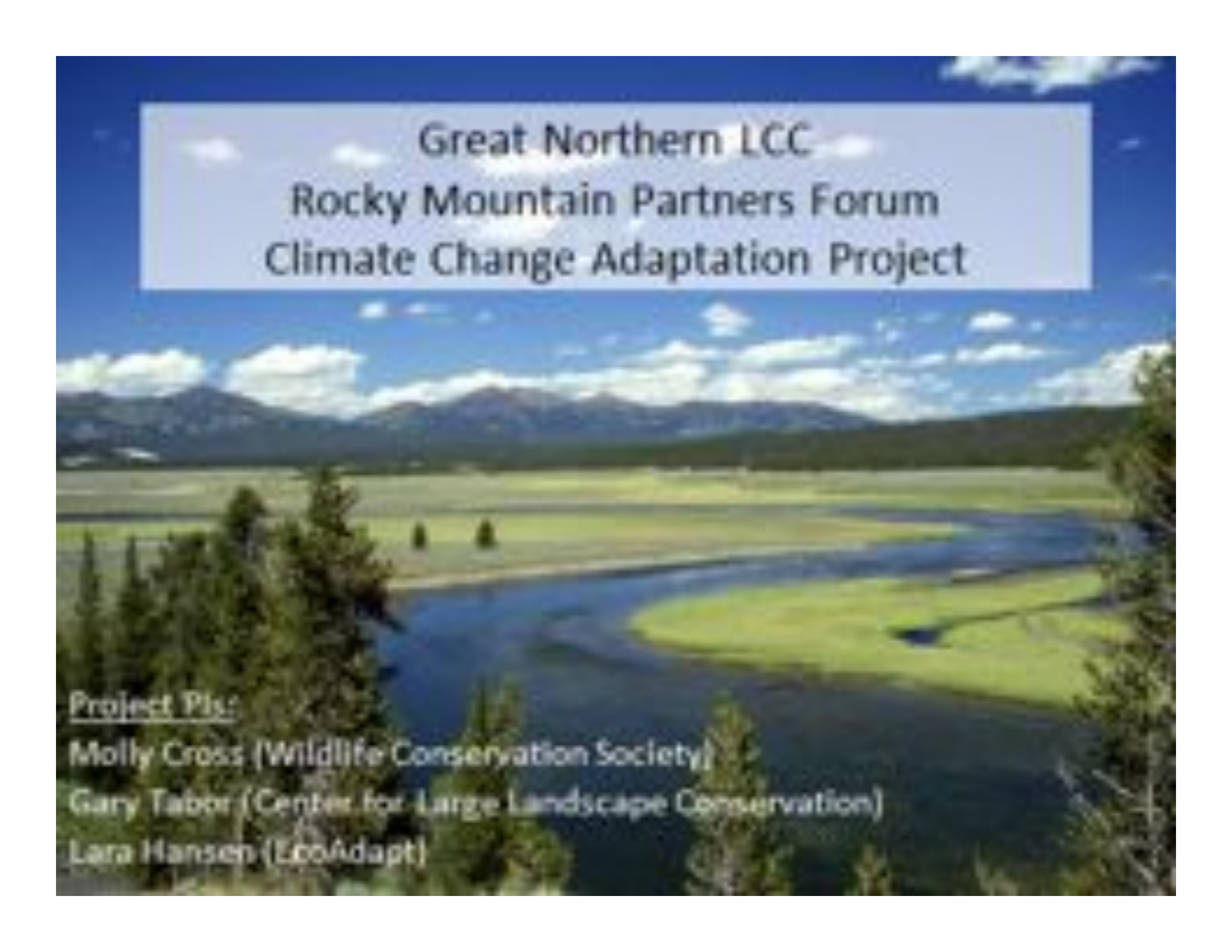


**Great Northern LCC**

**Crown of the Continent**

0 500 1,000 1,500 2,000





Great Northern LCC  
Rocky Mountain Partners Forum  
Climate Change Adaptation Project

Project PIs:

Molly Cross (Wildlife Conservation Society)

Gary Tabor (Center for Large Landscape Conservation)

Lara Hansen (EcoAdapt)





## Y2Y Climate Adaptation Network

Keeping you up to date with the latest news and papers on climate adaptation.

- Greg Pederson PhD - US Geologic Survey Northern Rockies Office, Bozeman, MT
- Lara Hansen PhD - Chief Scientist, EcoAdapt, Seattle, WA
- Fiona Schmiegelow PhD - University of Alberta, Boreal Initiative, Whitehorse, Yukon
- Ric Hauer PhD - University of Montana, Flathead Lake Biological Station, MT
- Molly Cross PhD - Wildlife Conservation Society, Bozeman, MT
- Charles Chester PhD - Brandeis University, Y2Y, Cambridge, MA
- Wendy Francis LLM - Program Director, Y2Y, Banff, AB
- Jim Pojar PhD - Northwest Institute, Smithers, BC
- Bob O. Manteaw PhD - Climate Change Adaptation Strategy Coordinator Climate Change Secretariat Alberta Environment
- John Wilmshurst PhD - Ecosystem Science Coordinator, Jasper National Park. AB
- Anne Carlson PhD - Climate Associate, Northern Rockies Regional Office, The Wilderness Society, Bozeman, MT
- Jennifer Miller MA - Montana Program Officer, Northern Rockies Regional Office, The Wilderness Society, Bozeman, MT
- Gary M. Tabor VMD MSc

# Overcoming Uncertainty Paralysis



“Probably the most visible example of unintended consequences, is what happens every time humans try to change the natural ecology of a place” – Margaret Wheatley

Some people skate to the puck, I *skate to where the puck is going to be.*  
Wayne Gretzky





